TABLE OF CONTENTS

	Page
Opinion of the Court of Appeals	1a
Judgment of the Court of Appeals	31a
Opinion of the District Court	32a
Order of the District Court	61a
Memorandum and Order of the District Court Certifying Issues for Interlocutory Appeal	62a
Order of the Court of Appeals Accepting Certification	67a
10 C.F.R. § 20.105 (1979)	68a
10 C.F.R. § 20.106 (1979)	68a
Petitioners' Rule 29.6 Statement	71a
List of Respondents	73a

Filed October 17, 1995

UNITED STATES COURT OF APPEALS
FOR THE THIRD CIRCUIT

No. 94-7599

IN RE: TMI

General Public Utilities Corp.;
Metropolitan Edison Company;
Jersey Central Power & Light Co.;
Pennsylvania Electric Co.;
Babcock & Wilcox Company;
McDermott Incorporated;
UE&C Catalytic, Inc. (Raytheon);
Burns & Roe Enterprises;
Dresser Industries,
Appellants

On Appeal from the United States District Court
for the Middle District of Pennsylvania
(D.C. Civil Action No. 88-cv-01452)

Argued May 1, 1995

Before: SCIRICA, McKEE and SAROKIN,
Circuit Judges

(Filed October 17, 1995)

ALFRED H. WILCOX, ESQUIRE
(ARGUED)
ELLEN K. SCOTT, ESQUIRE
Pepper, Hamilton & Scheetz
18th and Arch Streets
3000 Two Logan Square
Philadelphia, Pennsylvania 19103-2799

Attorneys for Appellants

LAURENCE S. BERMAN, ESQUIRE
(ARGUED)
ARNOLD LEVIN, ESQUIRE
Levin, Fishbein, Sedran & Berman
320 Walnut Street, Suite 600
Philadelphia, Pennsylvania 19106

LEE C. SWARTZ, ESQUIRE
Hepford, Swartz & Morgan
111 North Front Street
P.O. Box 889
Harrisburg, Pennsylvania 17108

WILLIAM R. WILSON, JR., ESQUIRE
654 North State Street
Jackson, Mississippi 39202

Attorneys for Appellees,
Dorothy L. Aldrich, et al.

LOUIS M. TARASI, JR., ESQUIRE
Tarasi & Johnson
510 Third Avenue
Pittsburgh, Pennsylvania 15219

Attorney for Appellees,
Estate of Henrietta Adams, et al.

OPINION OF THE COURT

SCIRICA, *Circuit Judge.*

In 1979, an accident occurred at a nuclear power facility near Harrisburg, Pennsylvania, releasing radiation into the atmosphere and catapulting the name, "Three Mile Island," into national consciousness. Sixteen years later, we are called on once again to consider the Three Mile Island accident as we determine the appropriate standard of care for the operators of the facility.

I. Procedural History

The accident at the Three Mile Island ("TMI") nuclear power facility occurred on March 28, 1979. As a result, thousands of area residents and businesses filed suit against the owners and operators of the facility,[1] alleging various injuries.[2] This case involves the consolidated claims of more than 2000 plaintiffs for personal injuries allegedly caused by exposure to radiation released during the TMI accident.

These cases began more than a decade ago, when plaintiffs filed a damage actions in the Pennsylvania state courts and the Mississippi federal and state courts.[3] After defendants removed the state cases to federal court, asserting federal jurisdiction under the Price-Anderson Act, we held that the Act created no federal cause of action and was not intended to confer jurisdiction on the federal courts. *See Kiick v. Metropolitan Edison Co.*, 784 F.2d 490 (3d Cir. 1986); *see also Stibitz v. General Pub. Utils. Corp.*, 746 F.2d 993 (3d Cir. 1984), *cert. denied*, 469 U.S. 1214 (1985). The actions were remanded to the appropriate state courts.

Subsequently, Congress enacted the Price-Anderson Amendments Act of 1988 ("1988 Amendments" or "Amendments Act"), Pub. L. No. 100-408, 102 Stat. 1066, which expressly created a federal cause of action for "public liability actions"[4] and provided that such suits arose under the Price-

---

1. Defendants in this case were, at the time of the TMI accident, "the owners and operators of the nuclear facility, companies which had provided design, engineering or maintenance services, and those vendors of equipment or systems installed in the facility." *In re TMI Litig. Cases Consol. II*, 940 F.2d 832, 836 (3d Cir. 1991), *cert. denied*, 503 U.S. 906 (1992).

2. Defendants have settled non-personal injury claims brought by individuals, businesses, and non-profit organizations within a twenty-five mile radius of the TMI facility. *See Stibitz v. General Pub. Util. Corp.*, 746 F.2d 993, 995 n.1 (3d Cir. 1984) (citing *In Re Three Mile Island Litig.*, No. 79-0432 (M.D. Pa. Sept. 9, 1981)), *cert. denied*, 469 U.S. 1214 (1985).

3. Counsel for plaintiffs concede they filed suit in Mississippi to take advantage of the state's six-year statute of limitations, instead of the two-year Pennsylvania statute.

4. The Amendments Act defined a "public liability action" as "any suit asserting public liability." 42 U.S.C. § 2014(hh) (1988). "[P]ublic liability" was defined as "any legal liability arising out of or resulting from a nuclear

Anderson Act. 42 U.S.C. § 2014(hh) (1988). The Amendments Act also provided for consolidation of such actions, including those already filed, in one federal district court. *Id.* § 2210(n)(2). Accordingly, these personal injury actions were removed to federal court and consolidated in the Middle District of Pennsylvania. We upheld the constitutionality of the retroactive application of the federal jurisdiction provisions of the Amendments Act and remanded the actions back to the district court. *In re TMI Litig. Cases Consol. II,* 940 F.2d 832 (3d Cir. 1991) (*"TMI II"*), *cert. denied,* 503 U.S. 906 (1992).

Contending they had not breached the duty of care, defendants then moved for summary judgment, which the district court denied. *In re TMI Litig. Cases Consol. II,* No. 88-1452, slip op. at 36 (M.D. Pa. Feb. 18, 1994). After holding that federal law determines the standard of care and preempts state tort law, *id.* at 23, the district court found the standard of care was set by the federal regulations: 1) prescribing the maximum permissible levels of human exposure to radiation[5] and 2) requiring radiation releases to be "as low as is reasonably achievable," which is known as the "ALARA" principle.[6] *Id.* at 28-29. The court held that each plaintiff must prove individual exposure to radiation in order to establish causation, but not to establish a breach of the duty of care. *Id.* at 30-31.

Upon defendants' motion, the district court certified for interlocutory appeal the duty of care and causation issues:

NOTES *(Continued)*

incident or precautionary evacuation," except for certain claims covered by workers' compensation, incurred in wartime, or that involve the licensed property where the nuclear incident occurs. *Id.* § 2014(w).

5. *See* 10 C.F.R. §§ 20.105, 20.106 (1979). For a discussion of these regulations, see *infra* part III.B.1.

6. "ALARA" is defined to mean "as low as is reasonably achievable taking into account the state of technology, and the economics of improvements in relation to benefits to the public health and safety, and other societal and socioeconomic considerations, and in relation to the utilization of atomic energy in the public interest." 10 C.F.R. § 20.1(c). The term appears in several sections of the C.F.R. including § 20.1(c), § 50.34a, and § 50.36a. For a further discussion of the term, see *infra* part III.B.

1) Whether 10 C.F.R. §§ 20.105 and 20.106, and not ALARA, constitute the standard of care to be applied in these actions;
2) Whether a particular Plaintiff's level of exposure to radiation or radioactive effluents relates solely to causation or also to the duty owed by Defendants.

In re TMI Litig. Cases Consol. II, No. 88-1452 (M.D. Pa. July 13, 1994).[7] We granted the petition for interlocutory appeal.

The district court had jurisdiction under 42 U.S.C. § 2210(n)(2) (1988). We have jurisdiction under 28 U.S.C. § 1292(b) (1988) and exercise plenary review over the legal questions certified. *See Buzzard v. Roadrunner Trucking, Inc.,* 966 F. 2d 777, 779 (3d Cir. 1992).

II. Preemption

Initially, we must address the district court's decision that federal law determines the standard of care, preempting state tort law. *See In re TMI Litig. Cases Consol. II,* No. 88-1452, slip op. at 23 (M.D. Pa. Feb. 18, 1994). The district court essentially relied on our holding in *TMI II,* 940 F.2d 832, 859 (3d Cir. 1991), *cert. denied,* 503 U.S. 906 (1992), and decisions following it.[8] *See In re TMI Litig. Cases Consol. II,* No. 88-1452, slip op. at 15-23 (M.D. Pa. Feb. 18, 1994). But plaintiffs contend that *TMI II* did not resolve this issue.

Under the 1988 Amendments, the applicable law for "public liability actions" is "the law of the State in which the nuclear incident involved occurs, unless such law is inconsistent" with federal law. 42 U.S.C. § 2014(hh) (1988). Thus, Pennsylvania tort law would control here, unless inconsistent with federal law. But *TMI II* decided this issue by preempting state tort law on the standard of care.

---

7. The district court also certified a question regarding punitive damages, which we discuss in a separate opinion. *See In Re: TMI,* Nos. 94-7600, 94-7601, 94-7602, slip op. (3rd Circuit October 17, 1995). We resolve other issues concerning the applicable statute of limitations in a third opinion.

8. *See, e.g., O'Conner v. Commonwealth Edison Co.,* 13 F.3d 1090, 1105 (7th Cir.) ("[W]e agree with the Third Circuit in *TMI* that it is clear . . . that state regulation of nuclear safety, through either legislation or negligence actions, is preempted by federal law."), *cert denied,* 114 S.Ct. 2711 (1994).

In *TMI II,* we considered the constitutionality of the 1988 Amendments, specifically, whether they improperly conferred "arising under" jurisdiction. 940 F.2d at 848-49. Examining the Amendments Act's "federal components," we found federal preemption of state tort law on the applicable standard of care. *See id.* at 858 ("Two Supreme Court cases indicate that the duty the defendants owe the plaintiffs in tort is dictated by federal law."); *id.* at 859 ("Permitting the states to apply their own nuclear regulatory standards, in the form of the duty owned by nuclear defendants in tort, would, however, 'frustrate the objectives of federal law.' ") (citation omitted); *id.* ("Under *Pacific Gas & Electric Co.,* states are preempted from imposing a non-federal duty in tort, because any state duty would infringe upon pervasive federal regulation in the filed of nuclear safety, and thus would conflict with federal law."). Thus, *TMI II* definitively resolved the issue whether federal law preempts state tort law on the standard of care.

But we also said, "Consequently the plaintiffs' rights will necessarily be determined, in part, by reference to federal law, namely the federal statutes and regulations governing the safety and operation of nuclear facilities." *Id.* at 860. Plaintiffs contend that, by using the term "in part," "this Court left open the question of whether the applicable duty of care is exclusively federal." Appellees' Br. at 37. We cannot agree. Because we held that federal law preempted state law on the duty of care, plaintiffs' rights had to be determined, at least in part, by federal law. We did not address whether federal law also controlled other aspects of plaintiffs' claims, such as causation and damages, because they were not at issue. *TMI II* controls, and federal law determines the standard of care and preempts state tort law. *See also O'Conner v. Commonwealth Edison Co.,* 13 F.3d 1090, 1105 (7th Cir.) (citing *TMI II*) (holding state law on the duty of care preempted in tort suits involving nuclear safety), *cert. denied,* 114 S. Ct. 2711 (1994).

III. Statutory and Regulatory History

Although it is clear that federal law governs the standard of care for tort claims arising from nuclear accidents, it is more difficult to discern the precise contours of that federal duty.

The question appears to be one of first impression for a federal appellate court.[9] Accordingly, we will examine the language of the relevant statutes and regulations, and the underlying history and policies.

A. Statutes

Nearly a half century ago, Congress initiated its regulation of nuclear power through the enactment of the Atomic Energy Act of 1946, Pub. L. No. 79-585, 60 Stat. 755. The Act was designed to establish an industry to generate inexpensive electrical power, transforming "atomic power into a source of energy" and turning "swords into plowshares." *Pacific Gas & Elec. Co. v. State Energy Resources Conservation & Dev. Comm'n,* 461 U.S. 190, 193 (1983).

Although the 1946 Act designated the nuclear industry a government monopoly, Congress later decided to permit private sector involvement. *See* Atomic Energy Act of 1954, Pub. L. No. 83-703, 68 Stat. 919. The 1954 Act "grew out of Congress' determination that the national interest would be best served if the Government encouraged the private sector to become involved in the development of atomic energy for peaceful purposes under a program of federal regulation and licensing." *Pacific Gas & Elec.,* 461 U.S. at 206-07 (citing H.R. Rep. No. 2182, 83d Cong., 2d Sess. 1-11 (1954)).

Nevertheless, because of the unique nature of this form of energy production, the fledgling nuclear industry faced many problems, particularly:

> the risk of potentially vast liability in the event of a nuclear accident of a sizable magnitude . . . . [W]hile repeatedly stressing that the risk of a major nuclear accident was extremely remote, spokesmen for the private sector informed Congress that they would be forced to withdraw from the filed if their liability were not limited by appropriate legislation.

Duke Power Co. v. Carolina Envtl. Study Group, Inc., 438 U.S. 59, 64 (1978) (citations omitted).

---

9. Some federal district courts and state courts have considered this issue, with varying results. *See infra* part IV.C.

In response, Congress enacted the Price-Anderson Act "to protect the public and to encourage the development of the atomic energy industry." Pub. L. No. 85-256 § 1, 71 Stat. 576 (1957). The Act limited the potential civil liability of nuclear plant operators and provided federal funds to help pay damages caused by nuclear accidents. *Id.* Congress has amended the Price-Anderson Act three times, most recently in 1988, "provid[ing] a mechanism whereby the federal government can continue to encourage private sector participation in the beneficial uses of nuclear materials." *In re TMI Litig. Cases Consol. II,* 940 F.2d 832, 853 (3d Cir. 1991) ("*TMI II*") (citing S. Rep. No. 218, 100th Cong., 2d Sess. 4, *reprinted in* 1988 U.S.C.C.A.N. 1476, 1479), *cert. denied,* 503 U.S. 906 (1992).

Throughout this period, Congress repeatedly sought to encourage the development of the nuclear power industry. Yet, Congress has continued the "dual regulation of nuclear-powered electricity generation: the Federal Government maintains complete control of the safety and 'nuclear' aspects of energy generation; the States exercise their traditional authority over the need for additional generating capacity, the type of generating facilities to be licensed, land use, ratemaking, and the like." *Pacific Gas & Elec.,* 461 U.S. at 211-12 (footnote omitted).

B. Regulations

Volume 10 of the Code of Federal Regulations (1979)[10] governs energy matters, and its first chapter regulates the Nuclear Regulatory Commission ("NRC").[11] Parts 20 and 50 of Chapter 1 are the relevant sections.

1. 10 C.F.R. Part 20

Part 20 of 10 C.F.R. ch. 1 outlines "Standards for Protection Against Radiation." Under the "General Provisions" of Part 20, § 20.1(c) provides a statement of the ALARA principle:

---

10. In this case, the relevant federal regulations were those in place at the time of the TMI accident in 1979. Unless otherwise noted, all citations to the Code of Federal Regulations refer to the 1979 version.

11. *See infra* note 20.

> In accordance with recommendations of the Federal Radiation Council, approved by the President, persons engaged in activities under licenses issued by the Nuclear Regulatory Commissison . . . should, in addition to complying with the requirements set forth in this part, make every reasonable effort to maintain radiation exposures, and releases of radioactive materials in effluents to unrestricted areas, *as low as is reasonably achievable.* The term "as low as is reasonably achievable" means as low as is reasonably achievable taking into account the state of technology, and the economics of improvements in relation to benefits to the public health and safety, and other societal and socioeconomic considerations, and in relation to the utilization of atomic energy in the public interest.

(emphasis added).

Immediately following the "General Provisions" of Part 20 is a subpart covering "Permissible Doses, Levels, and Concentrations," which regulates exposures of radiation to persons on the property of a nuclear facility, *see* 10 C.F.R. §§ 20.101-.104,[12] as well as those off premises, *see id.* § 20.105-.106. The latter regulations, governing "unrestricted areas,"[13] are relevant here because plaintiffs were outside the TMI premises when the alleged radiation exposures occurred.

Section 20.105 sets the "[p]ermissible levels of radiation in unrestricted areas," i.e., outside the TMI facility's boundaries. It mandates that the NRC approve license applications if the applicant shows its plan is not likely to cause anyone to receive radiation in excess of 0.5 rem[14] per year. § 20.105(a).

---

12. These regulations apply to persons in "restricted areas," which are defined as "any area access to which is controlled by the licensee for purposes of protection of individuals from exposure to radiation and radioactive materials." 10 C.F.R. § 20.3(a)(14).

13. An "unrestricted area" is "any area access to which is not controlled by the licensee for purposes of protection of individuals from exposure to radiation and radioactive materials, and any area used for residential quarters." *Id.* § 20.1(a)(17).

14. Doses of radiation of different ionizations are expressed in "rems," a unit of measurement that "embodies both the magnitude of the dose and its biological effectiveness." U.S. Dep't of Commerce, *Permissible Dose From External Sources of Ionizing Radiation: National Bureau of Standards*

In subsection (b), the regulation provides that except as authorized by the NRC, no licensee shall cause "[r]adiation levels which, if an individual were continually present in the area, could result in his receiving a dose in excess of" two millirems in any hour or 100 millirems in any week. The parties dispute whether the § 20.105 standard governing off-site exposure was violated during or after the TMI accident.

While § 20.105 defines the levels of radiation permitted in unrestricted areas, § 20.106 defines the levels of radioactivity permitted in liquid or airborne effluents released off premises. It provides that licensees "shall not possess, use, or transfer licensed material so as to release to an unrestricted area radioactive material in concentrations which exceed the limits specified in Appendix 'B', Table II of this part, except as authorized . . . ." Appendix B then lists more than 100 isotopes of almost 100 radioactive elements and provides the maximum permissible level of releases. Defendants admit that the radiation levels at the boundary of the TMI facility exceeded the § 20.106 standards after the 1979 accident.[15] Nevertheless, they claim that no plaintiff was in an area exposed to the impermissible levels.

2. 10 C.F.R. Part 50

In order to understand the ALARA concept and whether it forms part of the standard of care, it is necessary to exam-

---

NOTES *(Continued)*

Handbook 59 30-31 (1954); *see also* 10 C.F.R. § 20.4(c) (defining rem as "a measure of the dose of any ionizing radiation to body tissues in terms of its estimated biological effect relative to a dose of one roentgen (r) of X-rays").

15. *See* Appellants' Brf. at 6 ("[T]he concentrations of radioactivity at the site boundary exceeded the permissible levels set by 10 C.F.R. § 20.106 (1979)"); *id.* at 33 ("[D]efendants would concede" that "the amount of radiation at the edge of Three Mile Island exceeded the federal permissible dose levels"). Nevertheless, defendants contend "that no excess releases reached any inhabited areas, much less those inhabited by Plaintiffs. For example, Defendants' evidence indicates that the only regions where the effluents and the dose exceeded the federal levels were Three Mile Island itself, some of the Susquehanna River, and some other uninhabited islands in the river." *In re TMI Litig. Cases Consol. II,* No. 88-1452, slip op. at 34 n.10 (M.D. Pa. Feb. 18, 1994).

ine Part 50 of 10 C.F.R. ch. 1, which covers the "Domestic Licensing of Production and Utilization Facilities." Section 50.34a(a) requires that applications for construction permits include certain information about equipment design:

> An application for a permit to construct a nuclear power reactors [sic] shall . . . also identify the design objectives, and the means to be employed, for keeping levels of radioactive material in effluents to unrestricted areas as low as is reasonably achievable. The term "as low as is reasonably achievable" as used in this part means as low as is reasonably achievable taking into account the state of technology, and the economics of improvements in relation to benefits to the public health and safety and other societal and socioeconomic considerations, and in relation to the utilization of atomic energy in the public interest. The guides set out in Appendix I provide numerical guidance on design objectives for light-water-cooled nuclear power reactors to meet the requirements that radioactive material in effluents released to unrestricted areas be kept as low as is reasonably achievable. These numerical guides for design objectives and limiting conditions for operation are not to be construed as radiation protection standards.

Section 50.36a lists technical specifications "to keep releases of radioactive materials to unrestricted areas during normal reactor operations, including expected operational occurrences, as low as is reasonably achievable." § 50.36a(a). Subsection (b) provides in part:

> Experience with the design, construction and operation of nuclear power reactors indicates that compliance with the technical specifications described in this section will keep average annual releases of radioactive material in effluents at small percentages of the limits specified in § 20.106 of this chapter and in the operating license. At the same time, the licensee is permitted the flexibility of operation, compatible with considerations of health and safety, to assure that the public is provided a dependable source of power even under unusual operating conditions which may temporarily result in releases higher than such

> small percentages, but still within the limits specified in § 20.106 of this chapter and the operating license. It is expected that in using this operational flexibility under unusual operating conditions, the licensee will exert his best efforts to keep levels of radioactive material in effluents as low as practicable. The guides set out in Appendix I provide numerical guidance on limiting conditions for light-water-cooled nuclear power reactors to meet the requirement that radioactive materials in effluents released to unrestricted areas be kept as low as is reasonably achievable.

Appendix I to Part 50, referenced in §§ 50.34a and 50.36a then provides:

> numerical guides for design objectives and limiting conditions for operation to assist applicants for, and holders of, licenses for light-water-cooled nuclear power reactors in meeting the requirements of §§ 50.34a and 50.36a that radioactive material in effluents released from those facilities to unrestricted areas be kept as low as is reasonably achievable. Design objectives and limiting conditions for operations conforming to the guidelines of this Appendix shall be deemed a conclusive showing of compliance with the "as low as is reasonably achievable" requirements of 10 C.F.R. 50.34a and 50.36a. Design objectives and limiting conditions for operations differing from the guidelines may also be used, subject to a case-by-case showing of a sufficient basis for the findings of "as low as is reasonably achievable" required by §§50.34a and 50.36a.

The Part 50 Appendix I standards, governing permissible radiation releases, were set far below the levels permitted by §§ 20.105 and 20.106. The parties apparently agree that a plant operator's compliance with the Appendix I guidelines will shield it from liability. But they disagree on whether an operator's compliance with the higher emission levels permitted by §§20.105 and 20.106 also suffices to protect it from liability.

IV. Duty of Care

A fundamental disagreement in this case centers on which of the federal regulations, or combination thereof, sets the applicable standard of care for nuclear power defendants. Plaintiffs contend the ALARA regulations articulate the duty owed by defendants, while defendants claim that 10 C.F.R. §§ 20.105 and 20.106 govern.

The district court held that a "tri-level scheme," combining the ALARA regulations and 10 C.F.R. § 20.106, constituted the applicable standard of care. *In re TMI Litig. Cases Consol. II,* No. 88-1452, slip op. at 28 (M.D. Pa. Feb. 18, 1994). The court found that nuclear power defendants could not be held liable for radiation emissions below the minimum levels set by Appendix I of 10 C.F.R. part 50. *Id.* The court continued:

> [I]f Plaintiffs can prove that Defendants' emissions exceeded those levels set out in § 20.106, Defendants will have violated the relevant standard of care and will be held liable, provided Plaintiffs are also able to satisfy the causation and harm elements of their claims. If the evidence indicates that emissions levels fall between the two standards, Defendants may be held liable if Plaintiff can prove (along with the causation and harm prongs) that Defendants did not use their best efforts to reduce radioactive emissions.

Id. at 29. Both plaintiffs and defendants challenge this holding and, as we have noted, the district court certified whether 10 C.F.R. §§ 20.105 and 20.106, and not ALARA, constitute the applicable standard of care.

A. Development of Radiation Protection Standards

We begin our analysis with a review of 10 C.F.R. §§ 20.105 and 20.106. In 1957, the Atomic Energy Commission ("AEC") issued regulations "to establish standards for the protection of [nuclear plant] licensees, their employees and the general public against radiation hazards." 25 Fed. Reg. 8595, 8595 (1960). The dosage for persons in "unrestricted areas" (the public) was limited to ten percent of that permitted for persons in

"restricted areas" (plant employees). 22 Fed. Reg. 548, 549 (1957). The preface to the regulation explained, "It is believed that the standards incorporated in these regulations provide, in accordance with present knowledge, a very substantial margin of safety for exposed individuals. It is believed also that the standards are practical from the standpoint of licensees." *Id.*

In 1960, the AEC substantially revised these regulations. Upon recommendations from the Federal Radiation Council[16] and the National Committee on Radiation Protection,[17] the AEC promulgated §§ 20.105 and 20.106, setting 0.5 rem as the maximum yearly radiation exposure allowed for the general public.[18] 25 Fed. Reg. 8595, 8595 (1960). The AEC concluded

---

16. A 1959 amendment to the Atomic Energy Act created the Federal Radiation Council and ordered it to "consult qualified scientists and experts in radiation matters" in order "to advise the President with respect to radiation matters, directly or indirectly affecting health, including guidance for all Federal agencies in the formulation of radiation standards . . . ." Pub. L. No. 86-373, 73 Stat. 688, 690 (1959). Upon the establishment of the Environmental Protection Agency in 1970, the functions of the council were transferred to the EPA, and it was abolished. *See* Reorganization Plan No. 3 of 1970, 84 Stat. 2086, 2088-89 (1970); 35 Fed. Reg. 15623, 15624, 15626 (1970).

17. The National Bureau of Standards sponsored the creation of the Advisory Committee on X-ray and Radium Protection in 1929. In 1954, after the advent of atomic energy, the committee changed its name to the National Committee on Radiation Protection. *See* U.S. Dep't of Commerce, *Permissible Dose From External Sources of Ionizing Radiation: National Bureau of Standards Handbook 59* iii (1954). In 1964, Congress transformed the committee into the National Council on Radiation Protection and Measurements and charged it with developing information and recommendations concerning radiation protection. Pub. L. No. 88-376, §§ 3, 16, 78 Stat. 320, 321, 324 (1964) (codified at 36 U.S.C. §§ 4501-17 (1988)).

18. In 1991, the NRC issued new regulations reducing the annual permissible exposure rate for the public to 0.1 rem per individual — down from the 0.5 rem standard that had existed for more than three decades. *See* 10 C.F.R. § 20.1301 (1995); 56 Fed. Reg. 23398 (1991). The 1991 regulations adopted recommendations made by the International Commission on Radiological Protection in 1977. *See* Leonard S. Greenberger, *NRC Amends Radiation Protection Requirements,* Pub. Util. Fortnightly, Jan. 15, 1991, at 54, 54. Even with these reductions, the permissible exposure rate for the public in the United States remained higher than the .05 rem public exposure limit in Great Britain and the .03 rem limit in Germany. *See id.*

the new regulations represented "an appropriate regulatory basis for protection of the health and safety of employees and the public without imposing undue burdens upon licensed users of radioactive material." *Id.* The AEC stated:

> Recommended limits on exposure, based upon extensive scientific and technical investigation and upon years of experience with the practical problems of radiation protection, represent a consensus as to the measures generally desirable to provide appropriate degrees of safety in the situations to which these measures apply. While the numerical values for exposure limits established in this regulation provide a conservative standard of safety, the nature of the problem is such that lower exposure limits would be used if considered practical. At the same time, if there were sufficient reason, the use of considerably higher exposure limits in this regulation would not have been considered to result in excessive hazards.

Id. Four years later, in 1964, the AEC amended § 20.106 (and the Appendix B levels to which § 20.106 refers) to incorporate new recommendations made by the Federal Radiation Council to the President. *See* 29 Fed. Reg. 14434, 14434 (1964); *see also* 28 Fed. Reg. 10170, 10171 (1963). The new limitations were designed "to protect individuals in the general population from exposure to radiation as a result of intake of radioactivity through air and water." *Id.* These regulations remained in effect at the time of the TMI accident in 1979.[19]

B. Development of ALARA

A decade after promulgation of §§ 20.105 and 20.106, the Atomic Energy Commission amended 10. C.F.R. parts 20 and 50 to incorporate an early version of the ALARA rule. 35 Fed. Reg. 18385 (1970). The AEC noted that a general purpose of its regulatory policy was to ensure "radiation exposures to the public should be kept as low as practicable." *Id.* at 18386-87 (promulgating §§ 20.1(c)). The AEC then promul-

---

19. The regulations have been significantly modified since 1979. *See generally* 10 C.F.R. chs. 20, 50 (1995).

gated two sections in Part 50 to further this policy. First, it added § 50.34a to ensure that applicants for nuclear license permits identified "the design objectives, and the means to be employed," for keeping levels of radioactive material in effluents as low as practicable. Second, it enacted § 50.36a to require that licenses issued to nuclear operators include technical specifications to keep releases of radiation as low as practicable. *Id.* at 18387-88.

In 1975, these regulations were modified in two ways. First, the Nuclear Regulatory Commission, the statutory successor to the Atomic Energy Commission,[20] added Appendix I[21] to define the "as low as practicable" admonition with numerical criteria. But in doing so the agency emphasized the criteria were not to be considered "radiation protection standards." 40 Fed. Reg. 19439, 19439 (1975). Second, the NRC replaced the term "as low as practicable" with "as low as reasonable achievable"; the former term was deemed "less precise" and already had been replaced by the International Commission on Radiological Protection ("ICRP").[22] *Id.* at 58847.

C. Case Law

In framing their arguments, both plaintiffs and defendants rely on decisional law, although we find the applicable case law inconclusive. Plaintiffs, as well as the district court, cite *Crawford v. National Lead Co.*, 784 F. Supp. 439 (S.D. Ohio 1989). In *Crawford*, neighbors of a uranium production plant

---

20. The Atomic Energy Commission's regulatory functions were transferred to the Nuclear Regulatory Commission in 1974. *See* 40 Fed. Reg. 19439 (1975) (citing Energy Reorganization Act of 1974, Pub. L. No. 93-438, § 201(f), 88 Stat. 1242-43).

21. For a description of Appendix I, see *supra* part III.B.2.

22. The ICRP is an "international radiation standards setting agency." Robert K. Temple, *Regulation of Nuclear Waste and Reactor Safety within the Commonwealth of Independent States: Toward a Workable Model*, 69 Chi.-Kent L. Rev. 1071, 1088 (1994). Formed in 1928 to "discuss and recommend safety standards for the use of radiation," its recommendations have become a primary basis for federal government regulation of the nuclear industry. *A Guide to Toxic Torts* (MB), § 36.03[5](b), at 36-55 (1995).

sued over the plant's discharge of uranium into the atmosphere and a nearby river. In denying defendants' motion for summary judgment, the district court found sufficient evidence of state law violations. The court decided there was "no conflict between state tort law and the federal interests at issue here," because it found defendants had violated pertinent federal regulations, including ALARA. *Id.* at 447. Although the opinion cites favorably to the ALARA requirement, the court conducted a cursory review of the federal regulatory scheme and discussed the federal regulations only to demonstrate the absence of a conflict with state law.

For their part, defendants cite *Akins v. Sacramento Municipal Utility District,* 8 Cal. Rptr. 2d 785 (Cal. Ct. App. 1992), *dismissed,* 868 P.2d 905 (Cal. 1994), a suit alleging excessive discharges of radioactive materials from the Rancho Seco Nuclear Power Plant. The court noted that Appendix I and the ALARA standard in § 50.36a(b) were not radiation protection standards, *see id.* at 794 n.7, and affirmed the grant of defendants' motion for summary judgment. The court held that the evidence established that "no one, including any of the plaintiffs, was actually exposed to dosages of radiation which were more than a small fraction of the NRC and EPA standards." *Id.* at 814.

Defendants also cite several cases involving nuclear plant employees suing over alleged radiation exposures. In these cases, courts routinely applied the parallel federal regulations governing persons in "restricted areas," *see supra* note 12, but did not apply ALARA. For example, in *O'Conner v. Commonwealth Edison Co.,* 748 F. Supp. 672 (C.D. Ill. 1990), *aff'd,* 13 F.3d 1090, 1103-05 (7th Cir.), *cert. denied,* 114 S. Ct. 2711 (1994), a nuclear plant worker filed suit against the operator of the plant, alleging injuries from radiation exposure. After an analysis of the federal regulatory scheme, the district court held that the limits set in 10 C.F.R. § 20.101 (applicable to workers on site, just as §§ 20.105 and 20.106 apply to persons off site) supplied the duty of care. The court, without mentioning the ALARA regulations, stated:

> These federal permissible dose limits are based upon the national and international scientific consensus as to

> the hypothetical risk from exposure to low occupational levels of ionizing radiation. . . .
>
> In determining the likelihood of the injury from radiation, this Court believes that it should give deference to the administrative regulations which are the result of the agency's applied expertise.

Id. The Seventh Circuit affirmed the district court's ruling that federal law preempts state tort law and that the Amendments Act was constitutional, but it did not expressly discuss the applicable standard of care. *O'Conner,* 13 F.3d 1090 (7th Cir.), *cert. denied,* 114 S. Ct. 2711 (1994).

Similarly, in *Hennessy v. Commonwealth Edison Co.,* 764 F. Supp. 495 (N.D. Ill. 1991), a nuclear plant worker received a routine medical exam and learned he had been contaminated with a radioactive material, but at a level below that permitted by 10 C.F.R. § 20.103 (setting permissible levels for plant workers). Although he claimed no physical injury from the exposure, he sued under strict liability and for battery and negligent infliction of emotional distress. The district court granted summary judgment to defendants, but stated in dicta that ALARA might have constituted part of the relevant standard of care. *Id.* at 502.[23]

---

23. For other cases in which courts have used the chapter 20 permissible radiation levels as the standard of care in suits by nuclear plant employees, see *Coley v. Commonwealth Edison Co.,* 768 F. Supp. 625 (N.D. Ill. 1991) (granting summary judgment to defendant nuclear power plant because "the NRC regulations [specifically, § 20.102(b)] are determinative of the standard of care in occupational exposure cases"); *Whiting v. Boston Edison Co.,* No. 88-2125 (D. Mass. Sept. 5, 1991) ("[T]he Federal Permissible Dose Standard constitutes the duty of care owed to the decedent in the case."); *Jurka v. Commonwealth Edison Co.,* No. 88-C-7852 (N.D. Ill. Aug. 9, 1990) (granting summary judgment against worker because plant did not exceed regulatory levels of exposure permitted by § 20.101(b)). None of these cases discusses or applies ALARA. *But see Silkwood v. Kerr-McGee Corp.,* 485 F. Supp. 566, 580-83 (W.D. Okla. 1979) (holding state law not inconsistent with, and therefore not preempted by, federal radiation standards, including ALARA), *aff'd in part, rev'd in part,* 667 F.2d 908 (10th Cir. 1981), *rev'd,* 464 U.S. 238 (1984).

Although instructive, these cases do not resolve the precise issue here. Nevertheless, we note that no court appears to have actually applied ALARA as part of the duty of care.

D. Duty of Care

After reviewing the regulations, the reasons behind their promulgation, and the relevant case law, we hold that §§ 20.105 and 20.106 constitute the federal standard of care.[24] These regulations represent the considered judgment of the relevant regulatory bodies — the Federal Radiation Council, EPA, AEC, and NRC — on the appropriate levels of radiation to which the general public may be exposed.[25] *See, e.g.*, 25 Fed. Reg. 8595, 8595 (1960) (Sections 20.105 and 20.106 "provide

---

24. The Restatement (Second) of Torts expressly provides that, in certain situations, a "court may adopt as the standard of conduct of a reasonable man the requirements of a legislative enactment or an administrative regulation." Restatement (Second) of Torts § 286 (1965); *see also* W. Page Keeton et al., *Prosser and Keeton on the Law of Torts* § 36, at 220 (5th ed. 1984) (citing numerous cases) ("When a statute provides that under certain circumstances particular acts shall be done or not done, it may be interpreted as fixing a standard for all members of the community, from which it is negligence to deviate. The same may be true of . . . regulations of administrative bodies."). We believe it appropriate to adopt §§ 20.105 and 20/106 as the standard of conduct in this situation. As one commentator noted:

> The element of breach of duty is a critical issue in the adjudication of radiation cases and one that presents significant problems. The problems arise out of the necessity to create or adopt a legally sufficient standard by which to measure breach. The answer to the problem in this highly regulated area should be straightforward: compliance or noncompliance with applicable government safety standards provides an excellent measure of breach.

Davis S. Gooden, *Radiation Injury and the Law*, 1989 B.Y.U. L. Rev. 1155, 1167-68 (1989); *see also* John C. Berghoff, Jr., *NRC Regulations as a Standard for Legal Actions: Has the Public Shield Been Forged Into a Private Sword?, in* Nuclear Litigation 1984, at 57, 66 (PLI Litig. & Admin. Practice Course Handbook Series No. 272, 1984) ("It can be argued that the nuclear industry is appropriate for considering compliance to be conclusive proof of 'non-negligence' because Congress and the NRC have retained such close control over radiological hazards. The nations's leading experts on radiation danger were involved in establishing the federal standards, and a reasonably prudent person should be able to rely on them as a standard of conduct."). *But see id.* (offering alternative interpretations of the regulations).

25. As we have noted, these agencies have promulgated different standards regarding radiation levels for workers at nuclear power plants. *See* 10 C.F.R. §§ 20.101-.104; *see also supra* part III.B.1.

an appropriate regulatory basis for protection of the health and safety of employees and the public without imposing undue burdens upon licensed users of radioactive material."). In fact, the heading for this category of regulations is "Permissible Doses, Levels, and Concentrations," and the relevant regulations are phrased in terms of the maximum levels of radiation that may be released. *See* 10 C.R.F. §§ 20.101-.108.

Although plaintiffs assert that § 20.105 applies exclusively to nuclear plant employees, we disagree. Part 20 of 10 C.F.R. ch. 1 is divided into separate sections governing permissible dose limits for individuals in "restricted areas," *see* §§ 20.101, 20.103, and "unrestricted areas," *see* §§ 20.105, 20.106. The definitions of "restricted" and "unrestricted areas"[26] demonstrate that the C.F.R. sections governing persons in "unrestricted areas" were intended to cover persons outside a nuclear plant's boundaries, i.e., the general public. The case law, while differing over the use of the ALARA standard, appears to have uniformly accepted this meaning. *See, e.g., Akins,* 8 Cal. Rptr. 2d at 794; *Crawford,* 784 F. Supp. at 447.

Plaintiffs also contend that the Part 20 dose standards govern only during normal operating conditions, not during accidents. But neither the language of the regulations nor its history suggests this interpretation. Instead, we believe the Part 20 dose limits were intended as the maximum permitted under all conditions, accident and normal operations alike. The NRC itself has adopted this interpretation, stating it "believes that the dose limits for normal operation should remain the primary guidelines in emergencies," 56 Fed. Reg. 23360, 23365 (1991), and we believe this agency interpretation is entitled to some deference. *See Chevron, U.S.A. Inc. v. National Resources Defense Council, Inc.,* 467 U.S. 837, 844 (1984).

For many of the same reasons that we adopt §§ 20.105 and 20.106 as the applicable standard of care, we reject the ALARA regulations as part of that standard. First, we believe the language of the ALARA regulations compels this result. Section 50.34a explicitly provides:

---

26. *See supra* notes 12-13.

> The guides set out in Appendix I provide numerical guidance on design objectives for light-water-cooled nuclear power reactors to meet the requirements that radioactive material in effluents released to unrestricted areas be kept *as low as is reasonably achievable. These numerical guides for design objectives and limiting conditions for operation are not to be construed as radiation protection standards.*

(emphasis added). The regulation could not be more clear. The guidelines that satisfy ALARA "are not to be construed as radiation protection standards." *Id.*[27] In fact, § 50.36a(b) expressly permits continued operation of a nuclear plant if radiation releases rise above the Appendix I ALARA levels so long as they remain "within the limits specified in § 20.106."[28]

Second, the regulation that incorporated the Appendix I guidelines (that contains ALARA language) explained that the "radiation protection standards" of 10 C.F.R. Part 20 continued to protect public health:

> It should be emphasized that the Appendix I guides as here adopted by the Commission are not radiation protection standards. The numerical guides of Appendix I which we announce today are a quantitative expression of

---

27. We recognize some ambiguity in the regulatory history on whether ALARA is intended to serve as a radiation protection standard, *see e.g.*, 40 Fed. Reg. 19439, 19440 (1975); 35 Fed. Reg. 18385, 18386 (1970); Staff Report of the Federal Radiation Council, *Background Material for the Development of Radiation Protection Standards,* May 13, 1960, at 26; Staff Report of the Federal Radiation Council, *Background Material for the Development of Radiation Protection Standards,* Sept. 1961, at 1, but we are unpersuaded by these ambiguous regulatory statements.

28. In 1987, President Reagan approved an EPA memorandum that revised radiation protection standards for nuclear plant employees. That EPA memorandum noted that "[t]he recommendation that Federal agencies, through their regulations, operational procedures and other appropriate means, maintain doses ALARA is not intended to express, and therefore should not be interpreted as expressing, a view whether the ALARA concept should constitute a duty of care in tort litigation." 52 Fed. Reg. 2822, 2826 (1987).

> the meaning of the requirement that radioactive material in effluents released to unrestricted areas . . . be kept "as low as practicable."
>
> The Commission's radiation protection standards, which are based on recommendations of the Federal Radiation Council (FRC) as approved by the President, are contained in 10 CFR Part 20, "Standards for Protection Against Radiation," and remain unchanged by this Commission decision. . . . [T]hese FRC standards which have been previously adopted give appropriate consideration to the overall requirements of health protection and the beneficial use of radiation and atomic energy. The Commission believes that the record clearly indicates that any biological effects that might occur at the low levels of these standards have such low probability of occurrence that they would escape detection by present-day methods of observation and measurement.

40 Fed. Reg. 19439, 19439-40 (1975).

Furthermore, as we have noted, the Atomic Energy Commission adopted the reasoning of the Federal Radiation Council in promulgating the ALARA regulations. The Federal Radiation Council stipulated it had intended that federal agencies would determine the reasonableness of radiation releases. *See* Staff Report of the Federal Radiation Council, *Background Material for the Development of Radiation Protection Standards,* May 13, 1960, at 38 ("The Federal agencies should apply these Radiation Protection Guides with judgment and discretion, to assure that reasonable probability is achieved in the attainment of the desired goal of protecting man from the undesirable effects of radiation. The Guides may be exceeded only after the Federal agency having jurisdiction over the matter has carefully considered the reason for doing so . . . ."); Staff Report of the Federal Radiation Council, *Background Material for the Development of Radiation Protection Standards,* Sept. 1961, at 2 ("[N]o exposure to radiation should be permitted unless . . . [t]he various benefits to be expected as a result of the exposure, as evaluated by the appropriate responsible group, must outweigh the potential hazard or risk . . . .").

Finally, ALARA is defined as meaning "as low as is reasonably achievable taking into account the state of technology, and the economics of improvements in relation to benefits to the public health and safety, and other societal and socio-economic considerations, and in relation to the utilization of atomic energy in the public interest." *See* §§ 20.1(c); 50.34a(a). As the district court noted, if jurors make the ALARA determination, then this "results, essentially, in a negligence standard." *In re TMI Litig. Cases Consol. II,* No. 88-1452, slip op. at 29 (M.D. Pa. Feb. 18, 1994). Adopting ALARA as part of the standard of care would put juries in charge of deciding the permissible levels of radiation exposure and, more generally, the adequacy of safety procedures at nuclear plants — issues that have explicitly been reserved to the federal government in general and the NRC specifically. *See Pacific Gas & Elec.,* 461 U.S. at 212 ("[T]he Federal Government maintains complete control of the safety and 'nuclear' aspects of energy generation. . . .").[29]

Adoption of a standard as vague as ALARA would give no real guidance to operators and would allow juries to fix the standard case by case and plant by plant. An operator acting in the utmost good faith and diligence could still find itself liable for failing to meet such an elusive and undeterminable standard. Our holding protects the public and provides owners and operators of nuclear power plants with a definitive standard by which their conduct will be measured.[30]

---

29. Defendants concede that the NRC may cite operators of nuclear plants when it believes they have not complied with ALARA. Our holding does not diminish this NRC authority.

30. As one court noted, in adopting parallel regulations applicable to nuclear plant workers as the standard of care:

> In a highly technical field such as this, although a plaintiff should be provided a very high level [of] protection from excessive exposure to radiation, a defendant public utility should also be provided with some clear statement regarding how it may limit a worker's dose without exposing the worker to injury or itself to liability.

O'Conner v. Commonwealth Edison Co., 748 F. Supp. 672, 678 (C.D. Ill. 1990), *aff'd,* 13 F.3d 1090, 1103-05 (7th Cir.), *cert. denied,* 114 S. Ct. 2711 (1994).

V. Exposure Relevant to Duty or Causation?

The second certified question asks, "Whether a particular Plaintiff's level of exposure to radiation or radioactive effluents relates solely to causation or also to the duty owed by Defendants." The district court held that, to prove a breach of duty, plaintiffs need not prove they were located in areas in which radiation exceeded permissible levels. Instead, the court concluded that such evidence is relevant only to determine causation, i.e., whether plaintiffs' injuries were caused by the TMI accident. *See In re TMI Litig. Cases Consol. II,* No. 88-1452, slip op. at 30-31 (M.D. Pa. Feb. 18, 1994).

Defendants contend that plaintiffs must establish that they were located in areas exposed to radiation in excess of that allowed under §§ 20.105 and/or 20.106 to establish a breach of duty. Like the district court, we disagree.

A. Regulatory Language

The language of §§ 20.105 and 20.106, which regulate off-site radiation exposures, does not suggest that a breach occurs only when persons are exposed to excessive radiation. Instead, the regulations provide that a breach occurs whenever excessive radiation is released, whether or not anyone is present in the area exposed. Because the relevant unit of measurement (the rem) defines radiation levels in terms of their effect on persons, *see supra* note 14, the regulations must define impermissible radiation levels in the same way. For example, § 20.105(b) prohibits "[r]adiation levels which, if an individual were continuously present in the area, could result in his receiving a dose in excess of two millirems in any one hour," or "[r]adiation levels which, if an individual were continuously present in the area, could result in his receiving a dose in excess of 100 millirems in any seven consecutive days." As the language suggests, this regulation does not prohibit only those emissions that actually expose individuals to certain radiation levels. Instead, the regulation prohibits releases that could result in certain radiation levels if persons were present in the area. We believe the regulation would not use the conditional, "if," if it was meant to specify that persons must be present in the area exposed.

Similarly, the language of § 20.106 provides, "For purposes of this section the concentration limits in Appendix 'B', Table II of this part shall apply at the boundary of the restricted area." The regulation does not require that any person actually be present at the boundary line; it merely states that the regulation is violated if the radiation at the boundary exceeds the Appendix B limits.[31]

Therefore, the regulations provide that a violation occurs whenever radiation exceeds the §§ 20.105 and 20.106 levels — whether or not persons actually are located in the exposed areas. These regulations resemble those governing other areas of environmental safety, where the duty is breached by the release of pollutants, not by any subsequent personal injury.[32]

---

31. Section 20.106(d) mandates that "the concentration limits in Appendix 'B', Table II of this part shall apply at the boundary of the restricted area," except "[t]he concentration or radioactive material discharged through a stack, pipe or similar conduit may be determined with respect to the point where the material leaves the conduit." Therefore, to be precise, the regulation is violated when radiation exceeds the § 20.106 levels at the boundary of the facility or, if applicable, at a conduit exit.

32. For example, even absent allegations of personal injury, the EPA may impose penalties for, *inter alia*, violations of statutes and regulations governing air pollution, *see United States v. B & W Investment Properties*, 38 F.3d 362, 364 (7th Cir. 1994), *cert. denied*, 115 S. Ct. 1998 (1995); and toxic substances, *see Alm Corp. v. United States EPA, Region II*, 974 F.2d 380, 381-82 (3d Cir. 1992) *cert. denied*, 113 S. Ct. 1412 (1993). Similarly, "the NRC is authorized to impose civil penalties on licensees when federal standards have been violated." *Silkwood v. Kerr-McGee Corp.*, 464 U.S. 238, 257 (1984) (citing 42 U.S.C. § 2282). These fines are available for violations of "any applicable rule, regulation or order related to nuclear safety," 42 U.S.C. § 2282 (1988), not just those violations that result in personal injury. In fact, although defendants contend that no one was injured by the TMI accident, they received a $155,000 fine for violations of various NRC regulations and technical specifications. *See* Diane Sponseller, *The Increasing Use of Fines as an Enforcement Mechanism*, Pub. Util. Fortnightly, May 11, 1989, at 42, 42; *See also* Letter from Victor Stello, Jr., Director, NRC Office of Inspection and Enforcement, to R.C. Arnold, Sr. Vice President, Metropolitan Edison Company (Oct. 25, 1979). The penalty would have been higher — regulators had wanted to fine defendants $725,000 for the violations — but they were limited by a $25,000 per month maximum on fines then imposed by the Atomic Energy Act. *See id.* at 3.

B. Tort Law

Despite the regulations, defendants argue that, under traditional tort law principles, whether there has been a breach of duty is specific to each plaintiff. Thus, defendants contend that the duty element requires a showing that each individual plaintiff was exposed to radiation exceeding the §§ 20.105 and/or 20.106 permissible levels.

Under Pennsylvania law[33] and traditional tort principles, a negligence cause of action requires proof of four elements:

1) A duty or obligation recognized by the law, requiring the actor to conform to a certain standard of conduct for the protection of others against reasonable risks;
2) A failure to conform to the standard required;
3) A causal connection between the conduct and the resulting injury; and
4) Actual loss or damage resulting to the interests of another.

Griggs v. BIC Corp., 981 F.2d 1429, 1434 (3d Cir. 1992) (citations omitted); *see also Kleinknecht v. Gettysburg College*, 989 F.2d 1360, 1366 (3d Cir. 1993); *Morena v. South Hills Health Sys.*, 462 A.2d 680, 684 n.5 (Pa. 1983); W. Page Keeton et al., *Prosser and Keeton on the Law of Torts* § 30, at 164-65 (5th ed. 1984).

Whether a defendant owes a duty to a plaintiff is a question of law. *Kleinknecht*, 989 F.2d at 1366; *see also* Restatement (Second) of Torts § 328B (1965) (court determines whether "facts give rise to any legal duty on the part of the defendant" and "the standard of conduct required of the defendant by his legal duty"). Furthermore, the determination "whether to impose a duty is essentially one of policy." *Hoffman v. Sun Pipe Line Co.*, 575 A.2d 122, 125 (Pa. Super. Ct. 1990); *see also* Keeton et al., *supra*, § 53, at 358 ("[I]t should

---

33. As we have noted, the 1988 Amendments retroactively required the applicable law for "public liability actions" be "the law of the State in which the nuclear incident involved occurs, unless such law is inconsistent" with federal law. 42 U.S.C. § 2014(hh) (1988). Although we have held that federal law preempts state tort law on the standard of care, *see supra* part II, we find it useful to refer to state tort law in construing the relationship between the elements of duty and causation.

be recognized that 'duty' is not sacrosanct in itself, but is only an expression of the sum total of those considerations of policy which lead the law to say that the plaintiff is entitled to protection.")

In this case, the applicable regulatory agencies already have weighed the competing policy considerations. As we have noted, the Atomic Energy Commission viewed §§ 20.105 and 20.106 as providing a balance between public safety and operational practicality. *See* 25 Fed. Reg. 8595 (1960). Although the AEC noted that its regulations provided a "conservative standard of safety," it said it realized that "lower exposure limits would be used if considered practical" and "considerably higher exposure limits . . . would not have been considered to result in excessive hazards." *Id.* Thus, the federal regulatory agencies have analyzed the competing policies in defining acceptable (and non-acceptable) conduct. We hold that the duty of care is measured by whether defendants released radiation in excess of the levels permitted by §§ 20.105 or 20.106, as measured at the boundary of the facility, not whether each plaintiff was exposed to those excessive radiation levels.

Because defendants conceded that they violated § 20.106, they violated their duty of care, thus satisfying the first and second elements of a negligence action.[34] *See Griggs,* 981 F.2d at 1434. Of course, plaintiffs still must prove causation and damages before they may recover. *Id.*

This situation is analogous to the practice followed by many jurisdictions with negligence per se cases. In such cases,

---

34. We note that "the scope of the duty not to place others at risk is limited to those risks which are reasonably foreseeable." *Maxwell v. Keas,* 639 A.2d 1215, 1217 (Pa. Super. Ct. 1994); *see also* Keeton et al., § 43 at 280 (negligence "necessarily involves a foreseeable risk"). Thus, there may be cases in which plaintiffs were located far enough away from a defendant's power plant that any injuries from excessive radiation released at the boundary of the plant would be unforeseeable. *See, e.g., Palsgraf v. Long Island R.R. Co.,* 162 N.E. 99 (N.Y. 1928). Nevertheless, we believe it is entirely foreseeable for nuclear power plant operators to expect that any excessive radiation releases might cause harm, even if the injured were not at the precise spots where the radiation exceeded federal levels, but instead were located in areas where radiation could spread via wind, rain, or water.

where defendants violated the relevant statute or regulation, courts have held as a matter of law that plaintiffs have satisfied the first two elements of their cause of action: the duty and breach of duty. Nevertheless, "[t]here will still remain open such questions as the causal relationship between the violation and the harm to the plaintiff . . . ." Keeton et al., *supra*, § 36, at 230; *see also* 1 J.D. Lee & Barry A. Lindahl, *Modern Tort Law: Liability & Litigation*, § 3.33, at 102 (1980) ("Under the per se rule, the violation of an applicable statute is conclusive proof of negligence, leaving only the question of causation to be determined.") (footnote omitted).

But defendants contend that, if individual radiation exposures are not considered in determining breach of duty, they will be forced to stand trial on potentially thousands of meritless claims. We disagree. As part of the causation inquiry, each plaintiff must demonstrate exposure to radiation released during the TMI accident. *See In Re Paoli Railroad Yard PCB Litigation*, 916 F.2d 829, 860 (3d Cir. 1990) (holding exposure to be an element of claim for injuries from hazardous substance), *cert. denied*, 499 U.S. 961 (1991); *In re "Agent Orange" Prod. Liab. Litig.*, 996 F.2d 1425, 1437 (2d Cir. 1993) (requiring that plaintiffs "demonstrate with sufficient accuracy their levels of personal exposure to Agent Orange," in addition to "individual causation, i.e., that Agent Orange exposure caused the particular illnesses upon which they base their claims"), *cert. denied*, 114 S. Ct. 1125 (1994); *A Guide to Toxic Torts* (MB), § 10.01[2](a), at 10-5 (1995) ("In toxic tort litigation, however, causation is not a simple matter for the jury. The plaintiff must establish by a preponderence of evidence the presence of the injury-causing substance, that he or she has been exposed to the substance, and that the exposure has resulted in certain injuries.").[35]

---

35. *See also Latimer v. SmithKline & French Labs.*, 919 F.2d 301, 304 (5th Cir. 1990) (mandating evidence of "the requisite exposure" in case alleging injury from pesticide); *Catrett v. Johns-Manville Sales Corp.*, 756 F.2d 181, 185 (D.C. Cir. 1985) (noting that plaintiff has "burden of proving by admissible evidence that her husband's exposure to Celotex's [asbestos-containing] products had proximately caused his death"), *rev'd on other grounds*, 477 U.S. 317 (1986). Similarly, in *Thompson v. Southern Pacific*

In *Paoli,* plaintiffs claimed they were injured by exposure to high levels of polychlorinated biphenyls, better known as PCBs. We agreed with the district court that plaintiffs' *prima facie* case consisted of four elements:

> 1) that defendants released PCBs into the environment; 2) that plaintiffs somehow ingested these PCBs into their bodies; 3) that plaintiffs have an injury; and 4) that PCBs are the cause of that injury.

Id.; see also Hines v. Consolidated Rail Corp., 926 F.2d 262, 275 (3d Cir. 1991) (quoting *Paoli's* four required elements).

The first element represents a combination of the traditional duty and breach of duty elements, as stated in *Griggs, supra;* it assumes that defendants had a duty not to release PCBs into the environment but did so anyway. The remainder of the *Paoli* factors breaks up the causation and injury requirements into three elements, adding an "exposure" prong into the causation and injury inquiry. As in *Paoli,* this analysis is useful here, where the substance that allegedly injured plaintiffs also occurs naturally in the environment. This "exposure" element requires that plaintiffs demonstrate they have been exposed "to a greater extent than anyone else," i.e., that their "exposure level exceeds the normal background level." *Paoli,* 916 F.2d at 860-61.

Translated to this case, the *Paoli* factors require plaintiffs to show that: 1) defendants released radiation into the environment in excess of the §§ 20.105 or 20.106 levels; 2) plaintiffs were exposed to this radiation (although not necessarily at the levels prohibited by §§ 20.105 and 20.106); 3) plaintiffs have injuries; and 4) radiation was the cause of those injuries. Although defendants concede the first element here, summary

---

Transp. Co., 809 F.2d 1167, 1168 (5th Cir.), *cert. denied,* 484 U.S. 819 (1987), a railroad brakeman sued his former employer and a chemical company alleging that exposure to dioxin caused his illness. Before trial, the chemical company admitted that dioxin had contaminated its plant site. A jury found for plaintiff, but the Court of Appeals for the Fifth Circuit overturned the award. The court noted the plaintiff's evidence as to causation was insufficient because he failed to produce adequate evidence showing that he actually was exposed to dioxin and that dioxin caused his illness. *Id.* at 1169.

judgment still may be entered on any of the remaining issues, just as it ordinarily might be entered on the question of duty or breach thereof. *See, e.g., In re Agent Orange Prod. Liab. Litig.*, 611 F. Supp. 1290 (E.D.N.Y. 1985) (granting summary judgment to defendants because, even accepting plaintiff's claim that he was exposed to Agent Orange, "there is no proof that the diseases and symptoms suffered by him were caused by Agent Orange"), *aff'd on other grounds*, 818 F.2d 210 (2d Cir. 1987), *cert. denied*, 484 U.S. 1004 (1988); *Latimer v. Smith-Kline & French Labs.*, 919 F.2d 301, 304 (5th Cir. 1990) (affirming summary judgment on causation element for defendant in case alleging injury from pesticide "because the evidence in the record does not establish the requisite exposure"). Therefore, contrary to defendants' assertions, our holding on the scope of their duty will not require them to stand trial on meritless claims.

VI. Conclusion

In sum, defendants violated their standard of care if they released radiation exceeding the levels permitted under §§ 20.105 and 20.106 — whether or not individual plaintiffs were harmed. Once defendants exceeded the federal standards on radiation emission, they breached their duty. Plaintiffs' exposures to radiation remain relevant, but only to prove causation and damages.

For the foregoing reasons, we will affirm in part and reverse in part.

A True Copy:
Teste:

Clerk of the United States Court of Appeals
for the Third Circuit

UNITED STATES COURT OF APPEALS
FOR THE THIRD CIRCUIT

No. 94-7599

IN RE: TMI

General Public Utilities Corp.;
Metropolitan Edison Company;
Jersey Central Power & Light Co.;
Pennsylvania Electric Co.;
Babcock & Wilcox Company;
McDermott Incorporated;
UE&C Catalytic, Inc. (Raytheon);
Burns & Roe Enterprises;
Dresser Industries,
Appellants

On Appeal from the United States District Court
for the Middle District of Pennsylvania
(D.C. Civil Action No. 88-cv-01452)

Present: SCIRICA, McKEE and SAROKIN,
Circuit Judges

JUDGMENT

This cause came on to be heard on the record from the United States District Court for the Middle District of Pennsylvania and was argued by counsel May 1, 1995.

On consideration whereof, it is now here ordered and adjudged by this Court that the judgment of the said District Court entered July 15, 1994, be, and the same is hereby affirmed in part and reversed in part. All of the above in accordance with the opinion of this Court.

ATTEST:

Clerk

Dated: October 17, 1995

IN THE UNITED STATES DISTRICT COURT
FOR THE MIDDLE DISTRICT OF PENNSYLVANIA

IN RE TMI LITIGATION CASES CONSOLIDATED II	: :	CIVIL ACTION NO. 1:CV-88-1452
This Document Relates to: All Plaintiffs	: :	

MEMORANDUM

Before the court is Defendants' motion for summary judgment as to all Plaintiffs on the grounds that Defendants have not breached their duty of care owed to Plaintiffs. The matter has been fully briefed and is now ripe for review.

Discussion[1]

Plaintiffs allege that they suffer various injuries caused by radiation released during the accident at Three Mile Island (hereinafter "TMI"). To succeed on their claims, Plaintiffs must establish the duty owed by Defendants, breach of that duty, the proximate cause between the breach and Plaintiffs' compensable injuries, and the damages arising from those injuries.[2]

The question herein analyzed is what duty Defendants owed Plaintiffs. Defendants contend that their duty of care is governed by federal regulations which set the permissible levels of radiation and radioactive emissions (collectively "releases") that a nuclear power plant may disperse. Moreover, they contend they have never exceeded these levels in inhabited areas. In opposition, Plaintiffs argue that Defen-

1. This court's prior memorandum of June 15, 1993 adequately reviewed the facts and procedural history of the captioned action. Therefore, that background will not be repeated here.

2. Even under a strict liability theory, the analysis herein is applicable. As discussed below, Plaintiffs can not utilize strict liability, negligence, or negligence per se theories if they conflict with the federal regulatory scheme.

dants violated those federal regulations, or, in the alternative, that the applicable standard is prescribed by state tort law principles, not the federal regulations.

I. Summary Judgment Standard

The standards for the award of summary judgment under Federal Rule of Civil Procedure 56 are well known. As the Third Circuit Court of Appeals recently capsulized:

> Summary judgment may be entered if "the pleadings, deposition[s], answers to interrogatories, and admissions on file, together with the affidavits, if any, show that there is no genuine issue as to any material fact and that the moving party is entitled to a judgment as a matter of law." Fed. R. Civ. P. 56(c). An issue is "genuine" only if the evidence is such that a reasonable jury could return a verdict for the nonmoving party. *Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 106 S.Ct. 2505, 2510, 91 L.Ed.2d 202 (1986); *Equimark Comm. Finance Co. v. C.I.T. Financial Serv. Corp.*, 812 F.2d 141, 144 (3d Cir. 1987). If evidence is "merely colorable" or "not significantly probative" summary judgment may be granted. *Anderson*, 106 S.Ct at 2511; *Equimark*, 812 F.2d at 144. Where the record, taken as a whole, could not "lead a rational trier of fact to find for the nonmoving party, summary judgment is proper." *Matsushita Elec. Indus. Co. v. Zenith Radio*, 475 U.S. 574, 106 S. Ct. 1348, 1356, 89 L.Ed.2d 538 (1986).

Hankins v. Temple Univ., 829 F.2d 437, 440 (3d Cir. 1987). Once the moving party has shown that there is an absence of evidence to support the claims of the nonmoving party, the nonmoving party may not simply sit back and rest on the allegations in his complaint, but instead must "go beyond the pleadings and by her own affidavits, or by the depositions, answers to interrogatories, and admissions on file, designate specific facts showing that there is a genuine issue for trial."

Celotex Corp. v. Catrett, 477 U.S. 317, 324 (1986) *(quotations omitted)*. The court will consider Defendants' motion under these standards.

II. Statutory History

An understanding of the applicable standard of care must begin with a brief review of the pertinent legislation. In 1946, Congress passed the Atomic Energy Act, creating a federal monopoly over the use, ownership, and control of nuclear technology. Atomic Energy Act of 1946, Act of Aug. 1, 1946, 60 Stat. 755. Nine years later, Congress passed a second Act to encourage private development in the nuclear industry. Atomic Energy Act of 1954, Act of Aug. 30, 1954, ch. 1073, 68 Stat. 919, as amended 42 U.S.C. § 2011, *et seq.* The 1954 Act permitted private ownership and operation of nuclear power facilities but granted the Atomic Energy Commission the exclusive authority to "license the transfer, delivery, receipt, acquisition, possession and use of nuclear materials." *Pacific Gas & Electric Co. v. State Energy Resources Conservation & Dev. Comm'n*, 461 U.S. 190, 207 (1983) (hereinafter "*Pacific Gas*") (citing 42 U.S.C. §§ 2014(e), (2), (aa), 2061-64, 2071-78, 2091-2099, 2111-2114 (1976 ed. and Supp. V)). The *Pacific Gas* Court described the new relationship envisioned between the state and federal governments:

> Congress, in passing the 1954 Act and in subsequently amending it, intended that the Federal Government should regulate the *radiological safety* aspects involved in the construction and operation of a nuclear plant, but that the States retain their traditional responsibility in the field of regulating electric utilities for determining questions of need, reliability, cost, and other related state concerns.

Id. at 205 (emphasis added).

In 1959, Congress amended the Act, spelling out in greater detail the intended relationship between the federal and state governments. *See* 1959 Amendment to the Atomic Energy Act, as codified, 42 U.S.C. § 2021 (1988). While permitting the states more regulatory authority, the law mandated

that the federal government regulate the safety aspects of nuclear materials. 42 U.S.C. 2021(c)(4); *Silkwood v. Kerr-McGee, Corp.*, 464 U.S. 238, 250 (1984). The law also provided, in part:

> (k) Nothing in this section shall be construed to affect the authority of any State or local agency to regulate the activities for purposes *other than protection against radiation hazards.*

42 U.S.C. § 2021(k) (emphasis added). This provision set the stage for substantial case law exploring the parameters of federal preemption in the radiological safety arena.

In 1957, Congress passed the Price-Anderson Act which amended the Atomic Energy Act. Pub. L. No. 85-256, § 1.71 Stat. 576. The Price-Anderson Act placed a $560 million limit on liability arising from a nuclear accident at certain facilities. This limit was intended to balance the Congressional desire of compensating nuclear accident victims with the goal of encouraging nuclear technology by protecting against cataclysmic financial consequences of an accident.

Finally, in 1988, Congress passed the Price-Anderson Amendments Act extending federal jurisdiction over suits regarding nuclear incidents to include not only "extraordinary nuclear occurrences" but all public liability actions.[3] Pub. L. No. 100-408, 102 Stat. 1066 (1988). More germane to the issue here, the 1988 Amendments directed that the law of the state where the accident occurred be adopted as federal law in such public liability actions. Specifically, the enactment provided:

> A public liability action shall be deemed to be an action arising under section 2210 of this title, and the substantive rules for decision in such action shall be derived from the law of the State in which the nuclear incident involved occurs, *unless such law is inconsistent with the provisions of such section.*

42 U.S.C. § 2014(hh) (emphasis added).

---

3. A public liability action is any arising from a nuclear incident and asserting public liability. 42 U.S.C. § 2014(hh).

These various statutory provisions are accompanied by a comprehensive system of federal regulations establishing, *inter alia,* levels of permissible radiation. For example, 10 C.F.R. §§ 20.105 sets forth the permissible dose levels of radiation in unrestricted areas; 10 C.F.R. §§ 20.106, the permissible radioactive effluent emissions in unrestricted areas. Defendants contend that these regulations set the applicable standard of care.

The pertinent legislative and case history suggests three routes for determining the relationship between the federal regulations and state tort standards. First, as previously stated, 42 U.S.C. § 2021 provides that states retain regulatory functions over nuclear industry *except* to protect against radiation hazards. This provision has been clarified, as discussed below, by a history of case law examining the preemptive effect of federal law on radiological safety. These cases substantially have adopted field preemption analysis, as further discussed below. A second strand of preemption analysis has focused on any actual conflict between applying federal and state law. Third, 42 U.S.C. § 2014(hh) counsels that public liability actions are governed by state law "unless such law is inconsistent with the provisions of such section [42 U.S.C. § 2210]." This is akin to preemption analysis for "actual conflict."

This court will adopt the preemption mode of analysis herein. This accords with the bulk of the case law on the issue. Moreover, as described below, the cases addressing the applicable standard of care have merged these modes of analysis, using preemption as one indicator of whether state standards are reconcilable with federal ones.

III. Preemption

The Supremacy Clause of the United States Constitution provides that "[t]his Constitution, and the Laws of the United States which shall be made in Pursuance thereof . . . shall be the supreme Law of the Land . . . any Thing in the Constitution or Laws of any State to the Contrary notwithstanding." U.S. Const. art IV, cl. 2. From this clause flows the doctrine of

federal preemption of state law. Case law has established that federal preemption is triggered in three circumstances:

> (1) Congress may pass a statute that by its *express* terms preempts a state law,
>
> (2) Congress, though not expressly stating, may *imply* that it is preempting state law by occupation of an entire field of regulation, so that no room is left for supplementary state regulation,
>
> (3) Congress may speak neither expressly nor impliedly of preemption, nonetheless state law is preempted to the extent it *actually* conflicts with federal law; such a conflict occurs when
>
> > (a) compliance with both state and federal law is impossible or,
> >
> > (b) when state law stands as an impediment to a federal purpose.

Abbot v. American Cyanamid Co., 844 F.2d 1108, 1111 (4th Cir.), *cert. denied*, 488 U.S. 908 (1988) (citing *Michigan Canners and Freezers Ass'n v. Agric. Mktg. and Bargaining Bd.*, 467 U.S. 461, 469 (1984)) (emphasis added). *See also Cipollone v. Liggett Group, Inc.*, 505 U.S. _____, 112 S. Ct. 2608 (1992); *English v. General Elec. Co.*, 496 U.S. 72, 78-79 (1990).

As this court has previously explained:

> Analysis of preemption issues must "start with the assumption that the historic police powers of the States [are] not to be superseded by [federal law] unless that [is] the clear and manifest purpose of Congress." *Cipollone*, 120 L.Ed. 2d at 422. (citing *Rice v. Santa Fe Elevator Corp.*, 331 U.S. 218, 230 (1947)). There is a strong presumption against preemption when "Congress does not expressly state its intent," *Abbott*, 844 F.2d at 1112 (citing *Maryland v. Louisiana*, 451 U.S. 725 (1981)); when regulations pertain to health or safety issues, *Abbott*, 844 F.2d at 1112 (citing *Hillsborough County v. Automated Med. Labs*, 471 U.S. 707, 715 (1985)); when there is no federal

remedy for the plaintiff's injury, *Abbot,* 844 F.2d at 1112 (citing *Silkwood v. Kerr-McGee, Corp.,* 464 U.S. 238, 251 (1984), *reh'g denied,* 465 U.S. 1074 (1984), *cert. denied,* 476 U.S. 1104 (1986)); or in ambiguous cases. *Cipollone,* 120 L. Ed. 2d at 432 (Blackmun, J., concurring).

Hunsaker v. Surgidev Corp., Civil Action No. 1:CV-90-0919 slip op. at 5-6 (M.D. Pa. Dec. 14, 1992), *aff'd,* No. 93-7013 (3d Cir. Aug. 27, 1993).

IV. Preemption Law Applied

A. Regulations

A series of cases have addressed federal preemption of state *regulations* touching on nuclear power. These cases have relied substantially on field preemption analysis. This court has recently analyzed and summarized this case law: "to fall within the preempted field, state regulation must (1) have a direct and substantial effect (2) on decisions regarding radiological safety levels." *McNear v. Pennsylvania State Police,* Civ. Action No. 1:CV-92-1255, slip op. at 16 (May 10, 1993). For example, in the influential case of *Northern States Power Co. V. Minnesota,* 447 F.2d 1143 (8th Cir. 1971), *aff'd mem.,* 405 U.S. 1035 (1972), the court held that federal regulations preempted state regulations governing radioactive emissions, as the latter had a substantial effect on permissible radiation emission levels.

On the other hand, state regulations which only tangentially affect radiological safety have been upheld against preemption challenges. For example, in *English v. General Electric Co.,* 496 U.S. 72 (1990), the plaintiff had complained about several alleged violations at the nuclear facility where she worked and was soon after discharged from employment. The Court upheld an award arising from the state tort of intentional infliction of emotional distress since "this effect [wa]s neither direct nor substantial enough to place petitioner's claim in the pre-empted field." *Id.* at 78.

Similarly, state regulations have been upheld when their purpose is other than radiological safety. For instance, in *Pacific Gas,* the Court reiterated that states can not regulate

safety aspects of nuclear technology but upheld the challenged state statute, which limited construction of nuclear plants to ensure adequate waste storage and disposal, because of the law's *economic* (rather than radiological safety) purpose. *Pacific Gas,* 461 U.S. at 222-23. Similarly, in *Goodyear Atomic Corp. v. Miller,* 486 U.S. 174 (1988), the court determined that a suit arising from state tort law was not preempted since the state regulation at issue was wholly unrelated to radiation safety. Rather, the subject injury was caused by a protruding bolt on a scaffold.

B. Tort Law

While the cases examining federal preemption of state *regulations* are not necessarily dispositive to the question at bar, they suggest that a similar framework should apply to state *tort* standards with regulatory effects — that if those standards substantially impact on radiological safety, they are preempted by federal regulations.

Standards enacted as state regulations and those arising from common law are indistinguishable in effect. As this court commented in *Hunsaker:*

> Tort remedies *may* have regulatory consequences and thereby impose additional requirements on those parties attempting to comply with federal regulations. *See San Diego Bldg. Trades Council v. Garmon,* 359 U.S. 236, 247 (1959) ("[state] regulation can be as effectively exerted through an award of damages as through some form of preventative relief. The obligation to pay compensation can be, indeed is designed to be, a potent method of governing conduct and controlling policy."). A jury's finding of liability effectively creates a new standard or duty which defendants must follow to shield themselves from future liability. It is absurd to contend that this fear of liability will not induce manufacturers to conform their conduct to jury-set standards or that these standards do not, in reality, constitute new requirements which defendants must heed.

Id. at 14-15.

Actually, however, even the pivotal case in this field — if not for its holding but for the frequent citations to it — *Silkwood v. Kerr-McGee Corp.,* 464 U.S. 238 (1984), acknowledged the essential equivalence of common tort law and regulatory law.

In *Silkwood,* the estate[4] of a nuclear facility employee sued the plant for nuclear contamination of Silkwood and her apartment. The plaintiff brought two claims. The first for personal injury was dismissed after an analysis of workers' compensation law. The second, for property damage (arising from the apartment contamination), was brought under a strict liability theory, and resulted in a plaintiff's jury verdict. Addressing Defendants' appeal, the Supreme Court focused on the propriety of allowing punitive damages in the face of the atomic energy statutes cited above.

The Court clearly recognized that federal law preempts much state regulatory law relating to radiological safety:

> Congress' decision to prohibit the States from regulating the safety aspects of nuclear development was premised on its belief that the Commission was more qualified to determine what type of safety standards should be enacted in this complex area.

Id. at 250. The Court went on to acknowledge the similarities between regulatory and common law:

> If there were nothing more, this concern over the State's inability to formulate effective standards and the foreclosure of the States from conditioning the operation of nuclear power plants on compliance with state-imposed safety standards arguably would disallow resort to state law remedies . . . .

Silkwood, 464 U.S. at 250-51. However, as the Third Circuit has pointed out, there was "something more" — explicit congressional intent to permit state tort *remedies. In re TMI Litig. Cases Consol. II,* 940 F.2d 832, 859 (3d Cir. 1991), *cert. denied sub nom., Gumby v. General Pub. Util. Corp.,* ____U.S.____,

4. Ms. Silkwood was killed in a car accident.

112 S.Ct. 1262 (1992) (footnote omitted) (hereinafter *"TMI II"*) (citing *Silkwood,* 464 U.S. at 254). After finding that the field preemption doctrine did not preclude application of punitive damages, the *Silkwood* Court then examined the possibility of actual conflict between the award of such damages and the pertinent federal regulations:

> insofar as damages for radiation injuries are concerned, preemption should not be judged on the basis that the Federal Government has so completely occupied the field of safety that state remedies are foreclosed but on *whether there is an irreconcilable conflict between the federal and state standards* or whether the imposition of a state standard in a damages action would frustrate the objectives of the federal law.

Silkwood, 464 U.S. at 256 (emphasis added). This conflict test is essentially that prescribed by the pertinent federal statute (that went into effect after *Silkwood)* — state law applies *unless* inconsistent (irreconcilable) with federal law. The *Silkwood* Court then concluded that there was no "irreconcilable conflict" between the award of punitive damages under state law and the federal regulations.

At first glance, some of the language and reasoning of *Silkwood* might suggest that state tort standards are not preempted by federal regulations of permissible radiation levels. For several reasons, this court is not persuaded that *Silkwood's* reasoning should be broadly applied to permit state tort standards to eclipse the federal regulations establishing permissible levels of radiation releases.

First, the holding and language of *Silkwood* are limited to *damages. See, e.g., id.* at 256 (emphasis added) ("insofar as *damages* for radiation injuries are concerned"); *id.* at 251 (citation omitted) (emphasis added) ("there is no indication that Congress even seriously considered precluding the use of such *remedies* either when it enacted the Atomic Energy Act in 1954 or when it amended it in 1959"); *id.* at 251 (emphasis added) ("[m]ore importantly, the only congressional discussion concerning the relationship between the Atomic Energy Act and state tort *remedies* indicates that Congress assumed

that such *remedies* would be available"); *id.* at 251-52 (footnote omitted) (emphasis added) ("the discussion preceding [the Price-Anderson Act's] enactment and subsequent amendment indicates that Congress assumed that persons injured by nuclear accidents were free to utilize existing tort law *remedies); id.* at 253 (emphasis added) ("The belief that the NRC's exclusive authority to set safety standards did not foreclose the use of state tort *remedies* was reaffirmed when the Price-Anderson Act was amended in 1966"); *id.* at 255 (emphasis added) ("Other comments made throughout the discussion [before the Joint Committee on Atomic Energy on Proposed Amendments to Price-Anderson Act relating to Waiver of Defenses] were similarly based on the assumption that state *remedies* were available.")

Second, in addition to its focus on damages, the Court omitted any discussion about the relevant standard of care owed to the plaintiff. Although the plaintiff's property claim was brought under a strict liability theory, the Court chose not to address the plaintiff's choice of legal theory. *See Hennessy v. Commonwealth Edison Co.*, 764 F. Supp. 498, 501 (N.D. Ill. 1991) ("The propriety of allowing tort recovery on a negligence theory based on evidence of exposures that were otherwise within the permissible federal limits was an issue that was never explicitly addressed by any of the courts on appeal in *Silkwood.* Insofar as the *Silkwood* trial court's decision and the decision in [*Bennett v.*] *Mallinckrodt,* 698 S.W.2d 854 (Mo. App. 1985), *cert. denied,* 476 U.S. 1176 (1986)] may be read to allow recovery under state law based simply on evidence of a level of exposure less than that permitted by federal regulations, we respectfully disagree with those decisions." (footnotes omitted)).

This combination of omissions suggests that the Court's holding is limited to a finding that only that particular state tort remedy is immune from the preclusive grasp of the federal regulations.

Third, the crux of the *Silkwood* opinion was that imposition of punitive (and, implicitly, compensatory) damages would not impermissibly conflict with the federal scheme. While the government in *Silkwood* that punitive damages,

with their deterrent function, could conflict with any penalty scheme established by the federal regulations, the Court clearly rejected this line of argument.

Addressing the standard of care issue, however, the Third Circuit specifically rejected the argument that state standards would not conflict with federal standards. *TMI II,* 940 F.2d at 859 (distinguishing imposition of punitive damages from imposition of state tort standard, arguing that latter but not former is inconsistent with federal law).

In *TMI II,* while considering the constitutionality of the Price-Anderson Amendments Act of 1988, 42 U.S.C. § 2011 *et seq.,* the court expressed an expansive view of federal preemption:

> the Federal government maintains complete control of the safety and 'nuclear' aspects of energy generation . . . State safety regulation is not pre-empted only when it conflicts with federal law. Rather, the Federal Government has occupied the entire field of nuclear safety concerns, except the limited powers expressly ceded to the States. When the Federal Government completely occupies a given field . . . as it has done here, the test of preemption is whether the 'matter on which the State asserts the right to act is in any way regulated by the Federal Act.'

Id. at 858 (quoting *Pacific Gas & Electric Co.,* 461 U.S. at 212-13). With these principles in mind, the court opined that the standard of care owed by nuclear power facilities is set by the federal regulations:

> Two Supreme Court cases [*Pacific Gas & Electric Co.* and *Silkwood*] indicate that the duty the defendants owe the plaintiffs in tort is dictated by federal law.

TMI II, 940 F.2d at 858 (footnote omitted). The court continued, distinguishing *Silkwood:*

> Permitting the states to apply their own nuclear regulatory standards, in the form of the duty owed by nuclear defendants in tort, would . . . 'frustrate the objectives of the federal law.'

Id. at 859 (quoting *Silkwood*, 464 U.S. at 256).[5] The court further stated:

> Under *Pacific Gas & Electric Co.*, states are preempted from imposing a non-federal duty in tort, because any state duty would infringe upon pervasive federal regulation in the field of nuclear safety, and thus would conflict with federal law. *See* [*id.*] 461 U.S. at 204 ... Consequently, the plaintiffs' rights will necessarily be determined, in part, by reference to federal law, namely the federal statutes and regulations governing the safety and operation of nuclear facilities.

TMI II, 940 F.2d at 859-60 (footnote omitted).[6]

---

5. The Third Circuit, in Scirica's concurrence, also provided a way of distinguishing another problematic aspect of *Silkwood*. The Court in *Silkwood* had cited to a Senate hearing at which the participants recognized that nuclear plaintiffs could use a strict liability standard, if available at state law. *Id.* at 254 (citing S. Rep. No. 1605, at 12, 89th Cong., 2d Sess., 26 (1966) ("[a] claimant would have exactly the same rights that he has today under existing law — including perhaps, benefit of a rule of strict liability if applicable State law provides.")) Consequently, "[i]f Congress intended to permit strict liability, it could be argued that it also intended to permit the less intrusive option of fault-based standards of care that are more stringent than federal regulations." *In re TMI*, 940 F.2d at 870 n.3 (Scirica, J., concurring).

However, a strict liability standard clearly collides with the federal regulations on permissible radiation releases, a fact which the court of appeals in *Silkwood* recognized. *Silkwood v. Kerr-McGee Corp.*, 667 F.2d 908, 920 (10th Cir. 1981). Thus, the logical consequence is that either strict liability is permitted, even though inconsistent with federal law, or is preempted or precluded, thereby rendering the Senate's remarks misplaced.

Judge Scirica, in *In re TMI*, offered one basis for limiting the reach of *Silkwood's* concern about the viability of strict liability actions. He explained that "[section] 2210(n)(2) encompasses more than just actions incorporating federal standards of care," *In re TMI*, 940 F.2d at 869-70 (Scirica concurring) (citation omitted). Therefore, a strict liability theory could be utilized in situations where state law so permits and where federal regulations concerning permissible radiation releases are not at issue.

6. Plaintiffs contend that this language is but dicta and is therefore not binding on this court. Defendants, in contrast, fervently argue that the language is essential to the court's ultimate holding. The court agrees with Defendants; the Third Circuit was searching for the requisite federal element on which to base the constitutionality of federal question jurisdiction, and found it in the federally prescribed duty of care. Moreover, the language clearly predicts the Third Circuit's opinion on this issue.

Moreover, the Third Circuit was not persuaded that the possibility that state tort law could impose a higher standard than that imposed by the federal regulations would alter its analysis:

> The result [conflict with federal law] is the same regardless of whether the state adopts stricter or more lenient safety standards. If stricter standards are imposed, the state will create a disincentive to nuclear power that is in conflict with federal law. If more lenient standards are imposed, the state will undercut federal safety efforts.

Id. at 860 n.22.

Even Judge Scirica, who, in his concurrence disagreed with the majority that a discussion about the relevant standard of care was necessary to its holding, essentially did agree with the majority about the applicable duty of care. *See id.* at 876 (emphasis added) ("I would sustain § 2210(n)(2) based upon the *substantial likelihood* that public liability actions will involve federal questions regarding [inter alia] standards of care . . ."); *id.* at 870 ("Regardless of whether state tort law may impose a standard of care that differs from federal norms, that law will often incorporate federal standards, and therefore a large number of public liability actions will rest upon alleged violations of federal regulations.").

The Third Circuit's opinion about the applicable standards was followed by the Seventh Circuit in *O'Conner v. Commonwealth Edison Co.,* No. 92-2989 (7th Cir. Jan. 7, 1994). In *O'Conner,* a worker alleged that he had suffered cataracts caused by overexposure to radiation in the work-

---

NOTES *(Continued)*

Plaintiffs accurately point out that the Third Circuit did not allude to the regulations at issue here — 10 C.F.R. §§ 20.105, 20.106 — in its analysis whether federal regulations provided the applicable standard of care. Nonetheless, this court is not persuaded that this omission warrants acceptance of Plaintiffs' position. There are a variety of regulations — governing permissible dose limits to workers, to the public and during emergencies. Because the question of which federal standard applies was not before the Third Circuit, it had no reason to discuss the specific regulations.

place. The nuclear defendants argued that the standard of care owed to the plaintiff should be determined only in reference to the federal regulations setting permissible radiation levels, and that these levels had not been exceeded. The plaintiff countered that the federal safety regulations were merely evidence of the relevant state of care and did not conclusively establish it.

The Seventh Circuit agreed with the defendants, providing three alternative rationales for their conclusion. First, the court cited the portion of the Price-Anderson Amendments Act that dictates that, "the substantive rules for decision in such action shall be derived from the law of the State in which the nuclear incident involved occurs, unless such law is inconsistent with the provisions of such section." 42 U.S.C. § 2014(hh). In determining what Illinois (the forum state) would set as the applicable standard, the court explained that Illinois case law granted federal safety regulations a pivotal role in ascertaining state standards. Illinois case law had utilized the Restatement of Torts § 286[7] to determine the appropriate standard of care in analogous cases. Accordingly, the Seventh Circuit found proper the district court's application and analysis of § 286 and its conclusion that the federal radiation limitations would apply. *Id.* at 25 n.11.

The court also analyzed pertinent cases and concluded that the federal regulations would preempt state standards. Citing the Third Circuit, the *O'Conner* stated:

---

7. The Restatement provides:

The court may adopt as the standard of conduct of a reasonable man the requirements of a legislative enactment or administrative regulation whose purpose is found to be exclusively or in part

(a) to protect a class of persons which includes the one whose interest is invaded, and

(b) to protect a particular interest which is invaded, and

(c) to protect that interest against the kind of harm that has resulted, and

(d) to protect that interest against the particular hazard from which the harm results.

Restatement (Second) of Torts, § 286 (1965).

> we agree with the Third Circuit in *TMI* that it is clear from *Pacific Gas & Electric* and from *Silkwood* that state regulation of nuclear safety, through either legislation or negligence actions, is preempted by federal law.

O'Conner, at 27-28 (citing *TMI,* 940 F. 2d at 858).[8] Its conclusion that the federal regulations would preempt any state standard persuaded the *O'Conner* court that the state law setting the applicable standard would be determined wholly by the federal regulations. *Id.* at 27-28.

The court also stated that in the event that state law would not apply the federal regulations as the sole standard of care, the state law would be preempted. Finally, the court observed that its conclusion comported with the dictate in the Amendments Act — that state law be applied only if consistent with the Price Anderson Act. *Id.* at 28. A contrary state standard would upset the Act's careful balance between the dual goals of public protection and radiation development. *Id.* at 29.

A few district courts have arrived at the same conclusion as *O'Conner.* For example, the court in *Hennessy v. Commonwealth Edison Company,* 764 F. Supp. 498 (N.D. Ill. 1991) adopted the federal permissible dose limits as the applicable standard of care. *Id.* at 502-03. In *Hennessy* (cited favorably by the Third Circuit in *TMI II,* 940 F.2d at 859), the plaintiff, a nuclear power plant employee, was internally contaminated with radioactive cobalt. *Id.* at 497. The plaintiff's concerns about this contamination led to a duodenal ulcer which precipitated his lawsuit.

---

8. The *O'Conner* court further stated:

> In the field of nuclear safety, there is not only evidence of preemption, but also uncontradicted statements by the Supreme Court that federal nuclear safety regulations preempt all state safety regulations. For instance, in *Pacific Gas & Electric Co. v. State Energy Conservation & Development Commission,* 461 U.S. 190, 208 (1983), the Court concluded that 'the safety of nuclear technology was the exclusive business of the Federal Government.' Similarly, in *Silkwood v. Kerr-McGee Corp.,* 464 U.S. 238, 240-41 (1984), the Court reiterated that 'states are precluded from regulating the safety aspect of nuclear energy.'

Id. at 26.

In appraising the defendants' motion for summary judgement on the first count — negligent infliction of emotional distress — the court addressed the applicable standard of care. The defendants argued that the plaintiff's level of exposure and contamination were within the limits prescribed by the federal regulations, which, they contended, set the applicable standard of care. Relying on the district court's decision in *O'Conner* (which arrived at the same conclusion the appellate court later did), the *Hennessy* court held that the federal radiation limits establish the duty of care owed by the nuclear defendants. *Id.* at 501. Finding that *Silkwood* had never explicitly addressed the issue, the court distinguished *Silkwood*'s holding regarding the propriety of state law remedies from that of state law standards. *Id.* at 501. The court held that states may not regulate the radiological safety elements of nuclear facilities because Congress determined that the federal government is best situated to set the applicable safety standards. *Id.* at 501. The *Hennessy* court thus concluded that the federal regulations setting the permissible dose levels, 10 C.F.R. § 20.103 (setting dose limits for restricted areas), conclusively established the applicable standard of care. *Id.* at 501.

Other cases have embraced similar reasoning, and arrived at the same conclusion. *See Coley v. Commonwealth Edison Co.*, 768 F. Supp. 625 (N.D. Ill. 1991) (court adopted federal regulations on permissible occupational exposure of radiation); *Jurka v. Commonwealth Edison Co.*, No. 88C7852 (N.D. Ill. Aug. 9, 1990) (court adopted federal permissible dose limit as standard of care after analysis pursuant to Restatement § 286) ; *Whiting v. Boston Edison Co.*, No. 88-2125, slip op. at 2 (D. Mass. Sept. 5, 1991) (court adopted federal permissible dose standards; "To the extent that a question of state law might be raised that question is resolved by the opinion in [*TMI II*].") *But see McKay v. United States*, 703 F.2d 464 (10th Cir. 1983).[9]

9. In *McKay*, the plaintiffs, landowners residing around a nuclear weapons manufacturer, alleged that their soil had been contaminated by nuclear radiation. The court cited the Tenth Circuit opinion in *Silkwood*, 667 F.2d

C. Conclusion

The court's survey of the relevant case law clearly indicates that state regulations impacting radiological safety are preempted, under the field preemption doctrine. Further, case law addressing state tort standards counsels that if those standards conflict with federal standards, both the statutory mandate in 42 U.S.C. § 2014(hh), and preemption analysis, require that the state standard yield. While *O'Conner* arrived at the same conclusion only after first determining the scope of the state standard, this court believes that the latter inquiry is unnecessary, since no state standard but that adopting the federal standard could survive the analysis herein described. Thus, this court need not analyze what Pennsylvania law would prescribe. Unless Pennsylvania adopts the federal standard, it would be displaced by the federal regulations.

V. Federal Regulations

Having determined that federal regulations provide the applicable standard of care in the captioned action, the court must next determine exactly what those regulations prescribe. The pertinent regulations set specific levels of permissible radiation and effluents. The section limiting radiation, 10 C.F.R. § 20.105, provides:

NOTES *(Continued)*

908 (10th Cir. 1981) (the Supreme Court had not yet heard the *Silkwood* appeal) for the proposition that the Price-Anderson Act only preempts state tort law after a specific and factual analysis indicates that "the state action at issue 'competes substantially with the [Atomic Energy Commission] in its regulation of radiation hazards associated with plants having nuclear material." *Id.* at 469 (quoting *Silkwood*, 667 F.2d at 923). The court then reasoned that the facts of the case were not sufficiently different from the circumstances in *Silkwood* to warrant a different conclusion — that state tort action should not be precluded. *Id.* at 469. The court concluded that imposing tort liability would not significantly interfere with the federal regulations. *Id.* at 469.

While the decision in *McKay* does not support Defendants' position, neither is it very damaging. The court in *McKay* analyzed whether federal law preempted a private cause of action under state law; it never specifically addressed the question of what duty of care would be imposed on the defendants.

> (a) There may be included in any application for a license or for amendment of a license proposed limits upon levels of radiation in unrestricted areas resulting from the applicant's possession or use of radioactive materials and other sources of radiation. Such applications should include information as to anticipated average radiation levels and anticipated occupancy times for each unrestricted area involved. The Commission will approve the proposed limits if the applicant demonstrates that the proposed limits are not likely to cause any individual to receive a dose to the whole body in any period of one calendar year in excess of 0.5 rem.
>
> (b) Except as authorized by the Commission pursuant to paragraph (a) of this Section, no licensee shall possess, use or transfer licensed material in such a manner as to create in any unrestricted area from radioactive material and other sources of radiation in his possession:
>
> > (1) Radiation levels, which, if an individual were continuously present in the area, could result in his receiving a dose in excess of two millirems in any one hour, or
> >
> > (2) Radiation levels which, if an individual were continuously present in the area, could result in his receiving a dose in excess of 100 milirems in any seven consecutive days.

10 C.F.R. § 20.105. This section refers to "radiation," that is, rays (alpha, beta, gamma) emanating from a radioactive source located on the regulated site. *See* 10 C.F.R. § 20.3(12); Rogers Aff. (Def. Ex. E) at ¶ 11. The provision invites nuclear facilities to adopt one of two approaches. First, a facility may set its own radiation rates in unrestricted areas after Commission approval. The approval process requires that the applicant provide detailed information and ensure that individuals outside the restricted area will not receive more than .5 rems (500 mrems) per year. Second, the facility may observe the radiation limits established in § 20.105(b) (2 mrems per hour or 100 mrems in a week).

A second regulatory section addresses emission levels; 10 C.F.R. § 20.106 provides:

> (a) A licensee shall not possess, use, or transfer licensed material so as to release to an unrestricted area radioactive material in concentrations which exceed the limits specified in Appendix "B," Table II of this part, except as authorized pursuant to § 20.302 [waste disposal] of paragraph (b) of this section. For purposes of this section concentrations may be averaged over a period not greater than one year.
>
> (b) An application for a license or amendment may include proposed limits higher than those specified in paragraph (1) of this section. The Commission will approve the proposed limits if the applicant demonstrates:
>
> > (1) That the applicant has made a reasonable effort to minimize the radioactivity contained in effluents to unrestricted areas; and
> >
> > (2) That it is not likely that radioactive material discharged in the effluent would result in the exposure of an individual to concentrations of radioactive material in air or water exceeding the limits specified in Appendix "B," Table Ii of this part.
>
> (c) An application for higher limits pursuant to paragraph (b) of this section shall include information demonstrating that the applicant has made a reasonable effort to minimize the radioactivity discharged in effluents to unrestricted areas, and shall include, as pertinent:
>
> > (1) Information as to flow rates, total volume of effluent, peak concentration of each radionuclide in the effluent, and concentration of each radionuclide in the effluent averaged over a period of one year at the point where the effluent leaves a stack, tube, pipe, or similar conduit;
> >
> > . . . .

> (3) A description of the anticipated human occupancy in the unrestricted area where the highest concentration of radioactive materials from the effluent is expected, and, in the case of a river or stream, a description of water uses downstream from the point of release of the effluent.
>
> . . . .
>
> (d) For the purposes of this section the concentration limits in Appendix "B," Table II of this part shall apply at the boundary of the restricted area. The concentration of radioactive material discharged through a stack, pipe or similar conduit may be determined with respect to the point where the material leaves the conduit. If the conduit discharges within the restricted area, the concentration at the boundary may be determined by applying appropriate factors for dilution, dispersion or decay between the point of discharge and the boundary. . . .

10 C.F.R. § 20.106 (January 1, 1979). Appendix B then details permissible levels of numerous radioactive elements at the boundary of the restricted area. 10 C.F.R. Pt. 20 App. B. This section regulates radioactive materials, often in the form of particulates. These "emissions," then are different from simple radiation — and, are, consequently, disparately measured. Both sections — the first governing dosage from on-site radiation sources, the second governing radioactive emission levels — are relevant to the accident at TMI. (Def. Br. at 64.)

Defendants assert that the limits found in the two above-cited provisions conclusively establish the standard of care. Plaintiffs, however, point to an additional regulatory section which provides: "in addition to complying with the requirements set forth in this part, make every reasonable effort to maintain radiation exposures, and releases of radioactive materials in effluents to unrestricted areas, as low as is reasonably achievable [hereinafter 'ALARA']." Moreover, for emissions (as opposed to radiation) Appendix I to Part 50 establishes levels which "shall be deemed a conclusive showing of compliance with" the ALARA requirement. *See also* 10

C.F.R. §§ 50.34a(a), 50.36a(b). These figures permit the flexible and economic construction of a nuclear facility by permitting a minimal amount of acceptable releases.

Plaintiffs argue that Defendants were under a duty to limit radiation emissions to ALARA, rather than merely to contain radiation exposures to those provided in the aforementioned sections. At least one case has used ALARA as the applicable standard. In *Crawford,* the court noted:

> The AEC has established by regulation maximum permissible releases of source materials into the environment. 10 C.F.R. § 20.106 and App. B, Table II; *see Train v. Colorado Pub. Interest Research Group,* 426 U.S. 1, 6 . . . 1976). . . . The evidence in the instant case shows that defendants exceeded the dose limits set by the applicable regulations. For example, the DOE recognized that airborn uranium from the [defendant facility] had travelled offsite in heavy concentrations, thereby violating the 'as low as reasonably achievable' (ALARA) requirement codified at 10 C.F.R. 2.0.1.

784 F.Supp. at 447 (footnote omitted).

This court is not persuaded that the ALARA language sets the standard beyond which Defendants can be found liable. The regulations specifically provide: "These numerical guides for design objectives and limiting conditions for operation are not to be construed as radiation protection standards." 10 C.F.R. § 50.34a(a). Moreover, establishing the emission standard in reference to ALARA with its accompanying table would nullify the import of § 20.106.

On the other hand, the court is not persuaded that the ALARA language is altogether without significance. Rather, the regulations suggest that, at least for radioactive emissions, a tri-level scheme governs the standard of care owed by nuclear defendants.

First, Appendix I sets out emission levels which conclusively demonstrate that a nuclear operator is maintaining radioactive emissions at the ALARA level. Since nuclear facility operators need not construct a plant that emits less

than the ALARA levels, these figures indicate a cut-off, below which nuclear defendants can not be liable.

Second, the regulations suggest that nuclear facilities may emit more than that recommended by Appendix I but should attempt to keep releases low:

> . . . the licensee is permitted the flexibility of operation, compatible with considerations of health and safety, to assure that the public is provided a dependable source of power even under unusual operating conditions which may temporarily result in releases higher than such small percentages, but still within the limits specified in § 20.106 of this chapter and the operating license. It is expected that in using this operational flexibility under unusual operating conditions, the licensee will exert his *best efforts to keep levels of radioactive material in effluents as low as is reasonably achievable.* The guides set out in appendix I provide numerical guidance on limiting conditions for operation for light-water-cooled nuclear power reactors to meet the requirement that radioactive materials in effluents released to unrestricted areas be kept as low as is reasonably achievable.

10 C.F.R. § 50.36a(b). This results, essentially, in a negligence standard. Third, § 20.106 counsels that emissions in excess of the listed amounts expose the nuclear facility to liability.

In sum, the court concludes that if Defendants can prove that emissions levels were kept below those prescribed by the ALARA limits, they have met the applicable standard of care and, therefore, will be immune from liability for actions premised on the release of emissions. Moreover, if Plaintiffs can prove that Defendants' emissions exceeded those levels set out in § 20.106, Defendants will have violated the relevant standard of care and will be held liable, provided Plaintiffs are also able to satisfy the causation and harm elements of their claims. If the evidence indicates that emissions levels fall between the two standards, Defendants may be held liable if Plaintiff can prove (along with the causation and harm prongs) that Defendants did not use their best efforts to reduce radioactive emissions.

There are no corresponding figures for radiation releases that conclusively establish that the ALARA level has been met. Thus, the court concludes that if Plaintiffs can prove that Defendants exceeded the standards regulating radiation, and if they can prove the additional requirements — causation and damages — Defendants will be found liable. Further, if Plaintiffs can not show that radiation exceeded federal standards, but can show that Defendants have not used reasonable efforts to keep radiation ALARA, along with the causation and harm elements, Defendants will also be held liable.

VI. Was the Standard Breached?

Defendants argue that no radiation or radioactive emissions exceeded the federal levels in *inhabited* areas. Stating this theory in a slightly different form, Defendants claim "the evidence shows that none of the plaintiffs was exposed to radiation in amounts in excess of the permissible levels contained in the relevant federal regulations governing offsite exposures to the general population." (Def. Br. at 4.) Plaintiffs, of course, disagree.

Part of this question is legal, part factual. First, the court must determine whether Plaintiffs must prove that radioactive releases exceeded federal levels in any unrestricted area, or whether they must also show that the excess occurred in inhabited areas, or, more specifically, in areas where Plaintiffs were located. To some degree, this question converges with the causation inquiry — for if Plaintiffs can not prove that the levels exceeded the federal limits in any inhabited areas where they were located, it is likely that they will not be able to prove causation.

The second question is factual — did Defendants actually release radiation or radioactive emissions in excess of federal levels? This question is hotly debated by the parties' experts.

A. Legal Question

Defendants argue that, even if permissible levels are exceeded at the site boundary, they cannot be held liable unless the federal levels also were exceeded in inhabited areas, i.e. where Plaintiffs resided. (Def. Br. at 66.)

The court finds no support for Defendants' position in either the regulations or the pertinent statutes or case law. The regulations do not include language that require human presence in an unrestricted area to trigger application of the regulations. Part (a) of § 20.105 does permit a nuclear facility to propose its own levels of radiation "if the applicant demonstrates that the proposed limits are not likely to cause any individual to receive a dose to the whole body in any period of one calendar year in excess of 0.5 rem." However, Defendants provide no information to the court indicating that they have proceeded under this section.

Part (b) of § 20.105 mandates that a nuclear facility can not release "[r]adiation levels, which, if an individual were continuously present in the area, could result in his receiving a dose in excess of two millirems in any one hour, or . . . [r]adiation levels which, if an individual were continuously present in the area, could result in his receiving a dose in excess of 100 millirems in any seven consecutive days." 10 C.F.R. § 20.105. This section certainly implies a goal of protecting human life, but, with the conditional "if," does not confine its protection to only areas that actually were inhabited at a particular time.

Similarly, 10 C.F.R. § 20.106, *inter alia,* prescribes a nuclear facility from "releas[ing] to an unrestricted area radioactive material in concentrations which exceed the limits specified in Appendix 'B,' . . . ." Again, this mandate is not made contingent on human presence in the area where emissions are released. Part (b) does permit a nuclear facility to propose its own limits, upon a showing "[t]hat it is not likely that radioactive material discharged in the effluent would result in the exposure of an individual to concentrations of radioactive material in air or water exceeding the limits specified in Appendix 'B' . . . ." This also suggests a concern with human, as opposed to ecological, contamination. Nonetheless, Part (c) admonishes nuclear operators to make "a reasonable effort to minimize the radioactivity discharged in effluents to unrestricted areas . . . ." The section includes no requirement of human presence. Similarly, Part (d) provides:

> For the purposes of this section the concentration limits in Appendix "B," Table II of this part shall apply at the boundary of the restricted area. The concentration of radioactive material discharged through a stack, pipe or similar conduit may be determined with respect to the point where the material leaves the conduit. If the conduit discharges within the restricted area, the concentration at the boundary may be determined by applying appropriate factors for dilution, dispersion or decay between the point of discharge and the boundary.

10 C.F.R. § 20.106 (January 1, 1979). This very clearly indicates that measurement of effluents for the purposes of the regulatory levels does not take place only in inhabited regions, but either at the boundary of the restricted area, or the conduit exit.

If plaintiffs owned uninhabited land surrounding a nuclear facility, the court is not persuaded that they would not have a cause of action for property damage if the facility released radiation in excess of federally prescribed levels. This conclusion arises not only from the possibility of property, in contrast to personal, damage but also from the recognition that the federal regulations protect not only human life, but ecological health.

In sum, the court finds that Defendants' duty of care is determined solely in reference to the federal regulations, and, further, that a breach occurs when that duty is violated at the boundary of the restricted area.

B. Factual Question

The parties have submitted contrary evidence about radiation releases after the TMI accident. Defendants have presented evidence that radiation and emissions did not exceed applicable federal limits. Defendants assert that less than 9 million curies of radiation (primarily xenon-133) were released during the accident. (Daniel Aff. (Def. Ex. B) at ¶ 36.) Moreover, one of Defendants' reports concluded that the maximum theoretical human exposure outside TMI was less than 100 millirem. (TDR-TMI-116 (Exh. B attach'd to Woodard Aff. (Def. Ex. C)) at 4-19.) Similarly, testing of envi-

ronmental samples did not indicate that radioactive releases exceeded permissible levels. (Porter Aff. (Def. Ex. D) at ¶ 23.) Thermoluminescent dosimeters, (hereinafter "TLD's") used to measure gamma radiation, set up throughout the surrounding region also indicated millirem levels far below the permissible levels. (*Id.* at ¶¶ 12, 14.) Similarly, the President's Commission on the Accident at TMI concluded that even those residing within one mile received an average does of only 58.6 mrem, a figure far below the 500 mrem permissible level. (Def. Ex. H at 117.)[10]

In opposition, Plaintiffs have submitted three types of evidence. The first challenges the accuracy and scientific reliability of Defendants' proffered studies. For example, Plaintiffs have submitted evidence that Defendants' experts' erroneously computed the amount of radiation releases. (Ghanem Aff. (Pl. Ex. C) ¶ 113, 14, 24, 37; Hinrichsen Aff. (Def. Ex. G) at 6, 8; Vergeiner Aff. (Def. Ex. H) at 4.) Dr. Karsten Hinrichsen and Dr. Ignez Vergeiner, both meteorologists, have raised purported flaws in Woodard's research for failing to take into account certain factors. (Pl. Exs. G, H.) Finally, Dr. Peter Brunner, a health physicist, has concluded that Defendants' evidence regarding whole body scans of individuals living near TMI was flawed in failing to account for biological half life and excretion. (Pl. Ex. J.)

Plaintiffs also have presented evidence that radiation releases *did* exceed federal levels. Dr. Webb, a nuclear engineer, reviewed the various reports compiled and concluded

---

10. Defendants also submit evidence relevant to the argument described above — that no excess releases reached any inhabited areas, much less those inhabited by Plaintiffs. For example, Defendants' evidence indicates that the only regions where the effluents and the dose exceeded the federal levels were Three Mile Island itself, some of the Susquehanna River, and some other uninhabited islands in the river. (Woodard Aff. at figs. 1, 3, 4.) (Note that Figure 2 indicates an excess of radiation of one of the Susquehanna River's banks. *Id.* at fig. 2.)) Similarly, the Ad Hoc Dose Assessment Group, comprised of seven members of federal agencies, found no dose levels to individuals in excess of permissible levels. (Ad Hoc Group Report (Def. Ex. G) at 44-48.) Finally, Defendants' evidence indicates that residents near TMI tested negative for TMI contamination. (Porter Aff. (Def. Ex. D) at ¶ 17.)

that the releases from the accident were ten times higher than that estimated by Defendants; specifically, he believes that about 103 million curries of radioactive gases were released. (Webb Aff. at ¶ 44.) Dr. George Ghanem, an atmospheric transfer physicist, maintained that Defendants' experts failed to take into account meteorology and transfer physics in their calculations and concluded that radiation exposures far exceeded federally established permissible levels. (Ghanem Aff. at ¶ 35.) Similarly, Dr. James Gunckel, a radiobiologist and botanist, analyzed biological indicators of radiation and determined that radiation exceeding the federal levels was released from TMI. (Gunckel Aff. (Pl. Ex. D) at 10-11). Dr. Bruce Moholt, a biogenetist and toxicologist came to the same determination after analysis of lymphocyte depression, blood chemistry and cancer rates in the population residing near to TMI; he deducted that individuals were exposed to radiation in excess of 100 rems. (Moholt Aff. (Pl. Ex. E) at 6.) The research of Dr. Steven Wing, an epidemiologist, disclosed heightened rates of cancer which the doctor believes was caused by exposures above the regulatory limits, and concluded that radiation exposure exceeded 50 rems. (Wing Aff. at ¶ 8.) Finally, Plaintiffs have submitted evidence regarding the efforts Defendants took to minimize radiation release; this information could be relevant, as described above, if Plaintiffs are unable to prove that Defendants exceeded federal standards but can prove that their emissions exceeded the figures set out in the ALARA appendix.

Defendants have filed a motion to depose Plaintiffs' experts and have indicated that they seek to challenge the admissibility of some or all of the testimony of those experts. Assuming for the moment the admissibility of Plaintiffs' expert evidence, there remains a clear dispute as to a material fact — what radiation and emissions were released. This factual question can not be resolved in this memorandum, defeating the propriety of summary judgment.

At this point, the court will require the parties to confer in an attempt to agree on a plan and schedule to determine the admissibility of expert evidence. Such a meeting should take place within twenty days of this order. Within five days of

changes, the matter shall be referred to the designated reviewer of the committee for appropriate action. When a formal complaint by a grievance committee is not referred to the designated reviewer, or returned to the grievance committee for further action, the formal complaint shall be promptly forwarded to and reviewed by bar headquarters staff counsel who shall file the formal complaint, and furnish a copy of the formal complaint to the respondent. A copy of the record shall be made available to the respondent at the respondent's expense.

Current Rule 4-1.2

(c) **Limitation of Objectives of Representation.** A lawyer may limit the objectives of the representation if the client consents after consultation.

(d) **Criminal or Fraudulent Conduct.** A lawyer shall not counsel a client to engage, or assist a client, in conduct that the lawyer knows or reasonably should know is criminal or fraudulent. However, a lawyer may discuss the legal consequences of any proposed course of conduct with a client and may counsel or assist a client to make a good faith effort to determine the validity, scope, meaning, or application of the law.[151]

When the client's course of action has already begun and is continuing, the lawyer's responsibility is especially delicate. The lawyer is not permitted to reveal the client's wrongdoing, except where permitted or required by rule 4-1 6. However, the lawyer is required to avoid furthering the purpose, for example, by suggesting how it might be concealed. A lawyer may not continue assisting a client in conduct that the lawyer originally supposes is legally proper but then discovers is criminal or

---

151. Comment: .... Criminal, fraudulent, and prohibited transaction: A lawyer is required to give an honest opinion about the actual consequences that appear likely to result from a client's conduct. The fact that a client uses advice in a course of action that is criminal or fraudulent does not, of itself, make a lawyer a party to the course of action. However, a lawyer may not assist a client in conduct that the lawyer knows or reasonably should know to be criminal or fraudulent. There is a critical distinction between presenting as analysis of legal aspects of questionable conduct and recommending the means by which a crime or fraud might be committed with impunity.

fraudulent. Withdrawal from the representation, therefore, may be required.

Current Rule 4-3.7 *Lawyer as Witness*

(a) **When Lawyer May Testify.**

A lawyer shall not act as advocate at a trial in which the lawyer is likely to be a necessary witness on behalf of the client except where:

(1) the testimony relates to an uncontested issue;

(2) the testimony will relate solely to a matter of formality and there is no reason to believe that substantial evidence will be offered in opposition to the testimony;

(3) the testimony relates to the nature and value of legal services rendered in the case; or

(4) disqualification of the lawyer would work substantial hardship on the client.

Florida Evidence Code

Section 90.203 *Compulsory Judicial Notice Upon Request*

A court shall take judicial notice of any matter in Section 90.202[152] when a party requests it and:

(1) Gives each adverse party timely written notice of the request, proof of which is filed with the court, to enable the adverse party to prepare to meet the request.

(2) Furnishes the court with sufficient information to enable it to take judicial notice of the matter.

---

152. Section 90.202 involves matters which may be judicially noted, *e.g.*, paragraph six thereof states "Records of any court of this state or of any court of record of the United States or any state, territory, and jurisdiction of the United States.

Section 90.616 *Exclusion of Witnesses*

(1) At the request of a party the court shall order, or upon its own motion the court may order, witnesses excluded from a proceeding so that they cannot hear the testimony of other witnesses except as provided in subsection (2).

(2) A witness may not be excluded if he is:

(a) A party who is a natural person.

(b) In a civil case, an officer or employee of a party that is not a natural person. The party's attorney shall designate the officer or employee who shall be the party's representative.

(c) A person whose presence is shown by the party's attorney to be essential to the presentation of the party's cause.

(d) In a criminal case, the victim of the crime, the victim's next of kin, the parent or guardian of a minor child victim, or a lawful representative of such person, unless, upon motion, the court determines such person's presence to be prejudicial.

Respectfully submitted, this 15th day of November, 1995.[153]

William A. Calvo, III, *Pro Se*
11355 Southeast 54th Avenue; Belleview, Florida 34420
(904) 245-4126

153. Re-submitted on January 12, 1996, in modified printing format. as required by the Court.